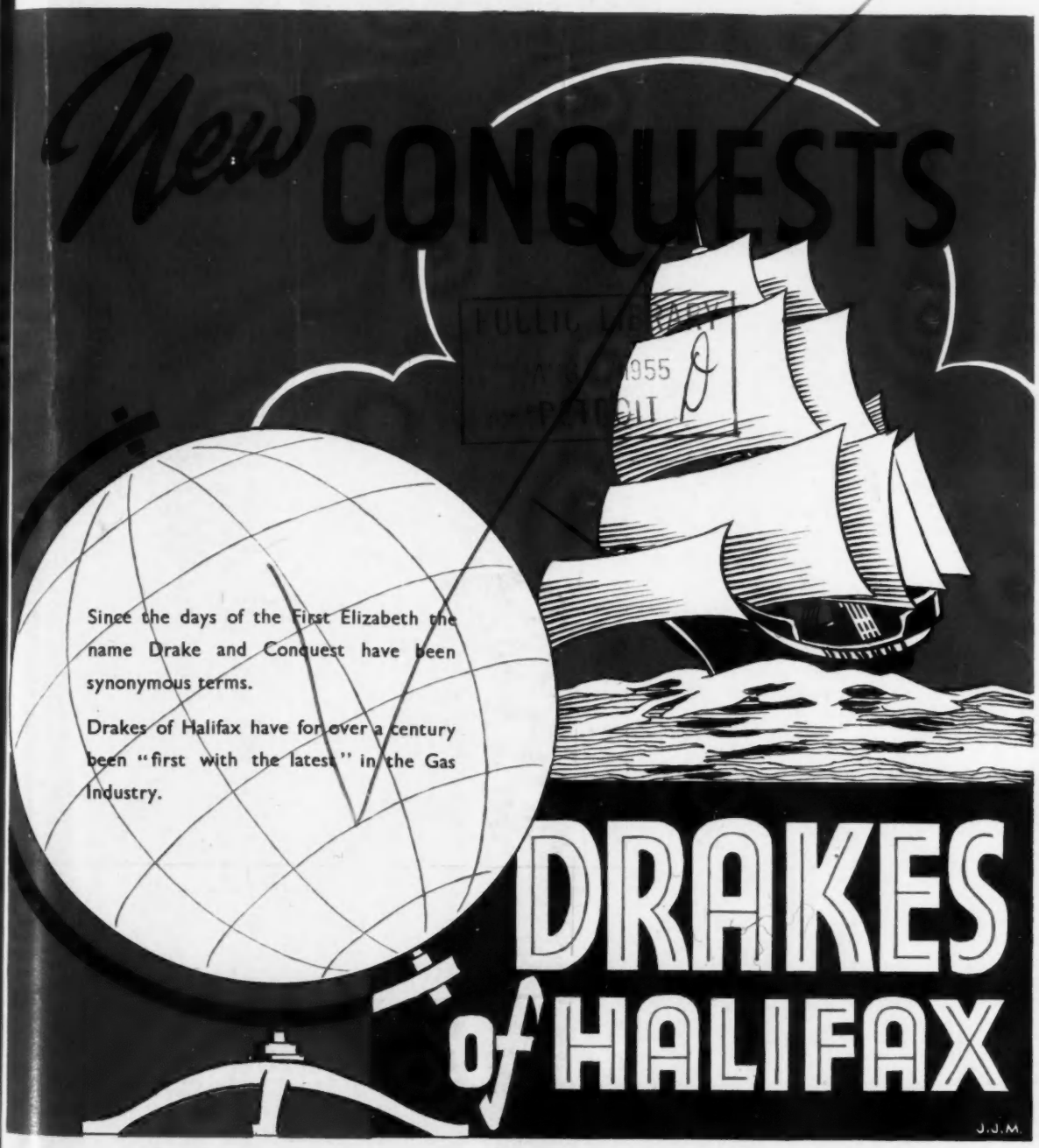
Gas Journal

VOL. 283. 107th YEAR. LONDON, JULY 20, 1955 Nº 4807. PRICE 1/3

TECH... DEPT.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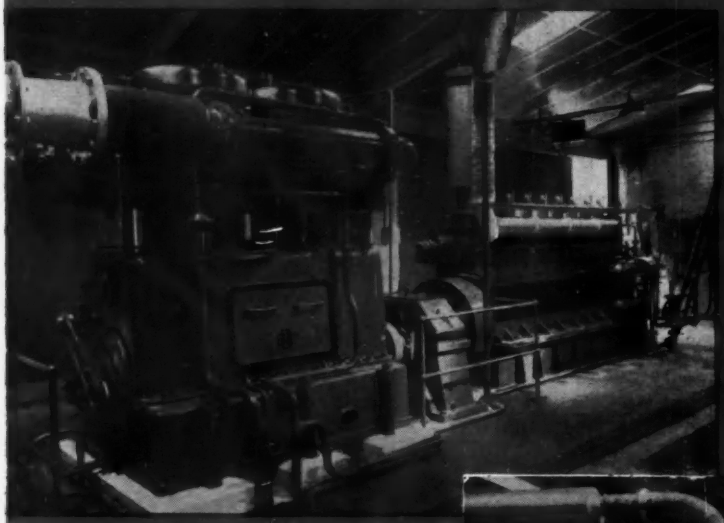

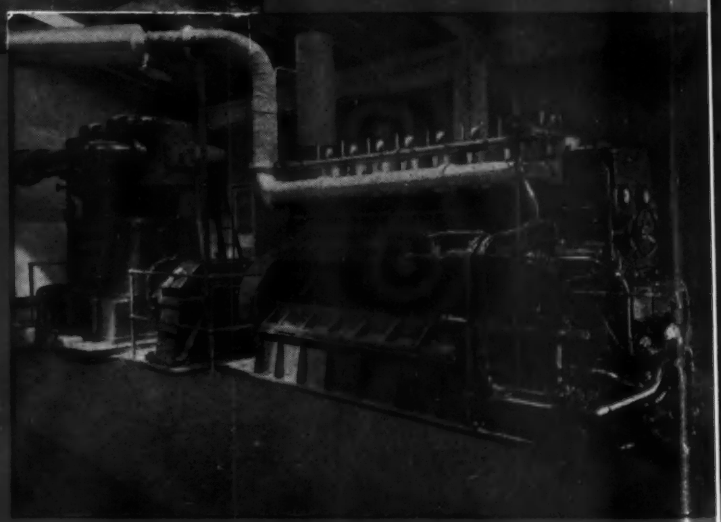

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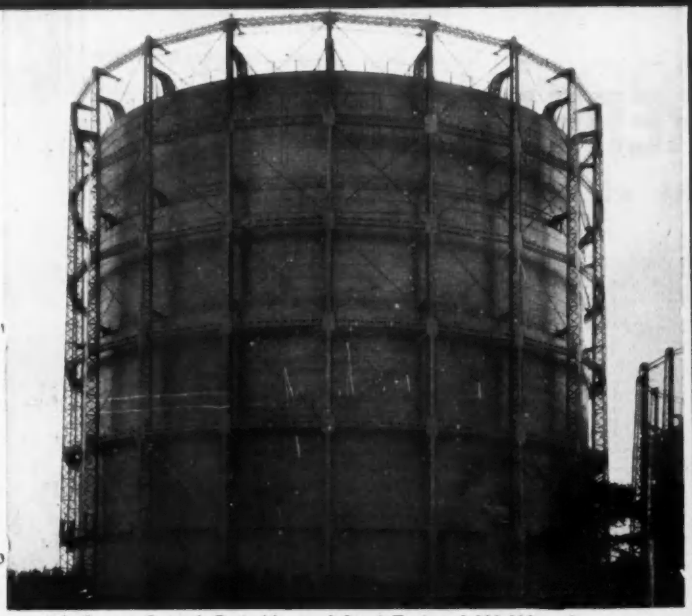

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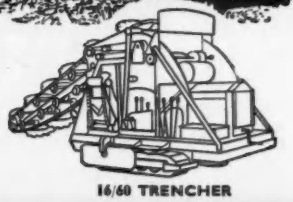

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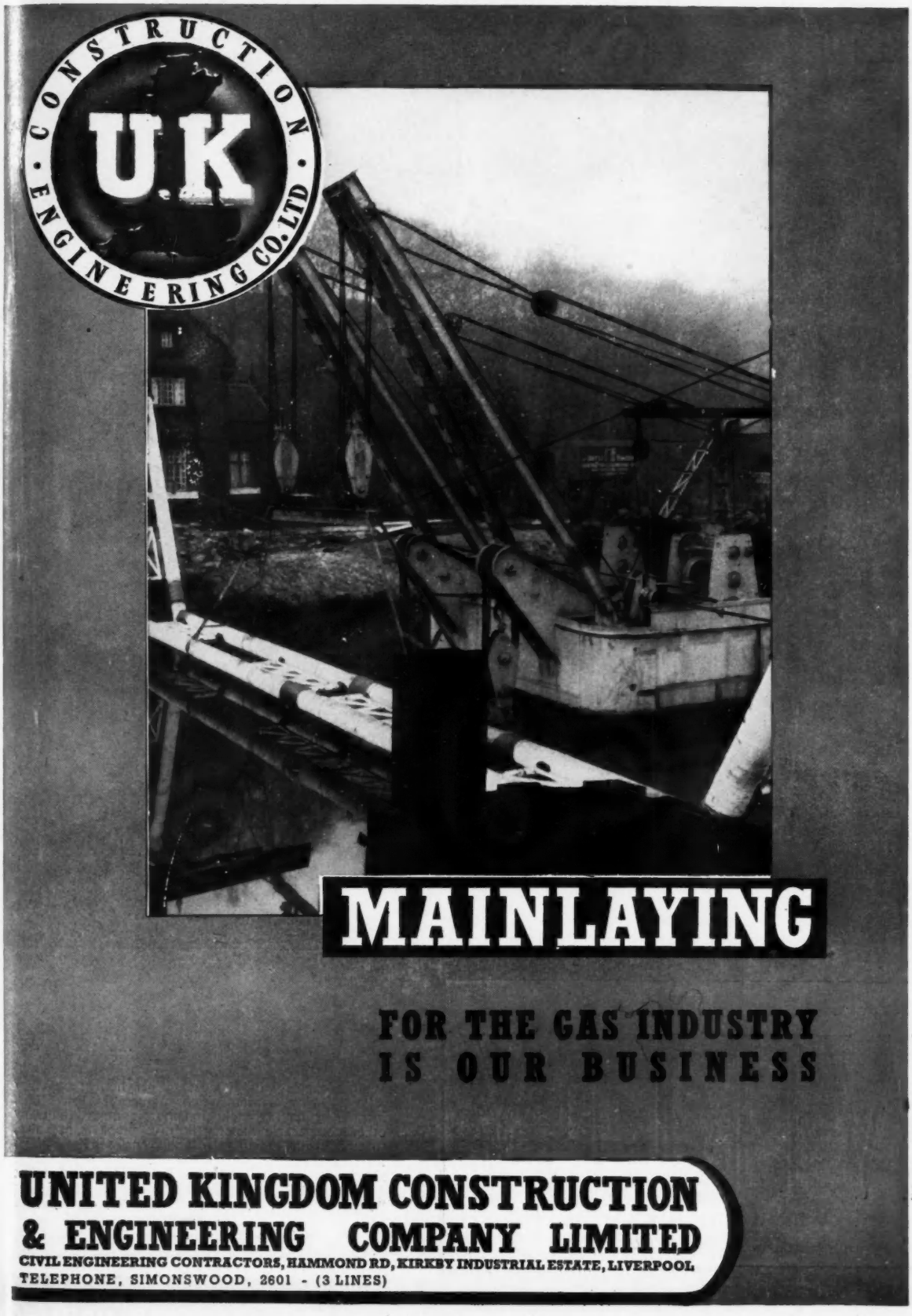
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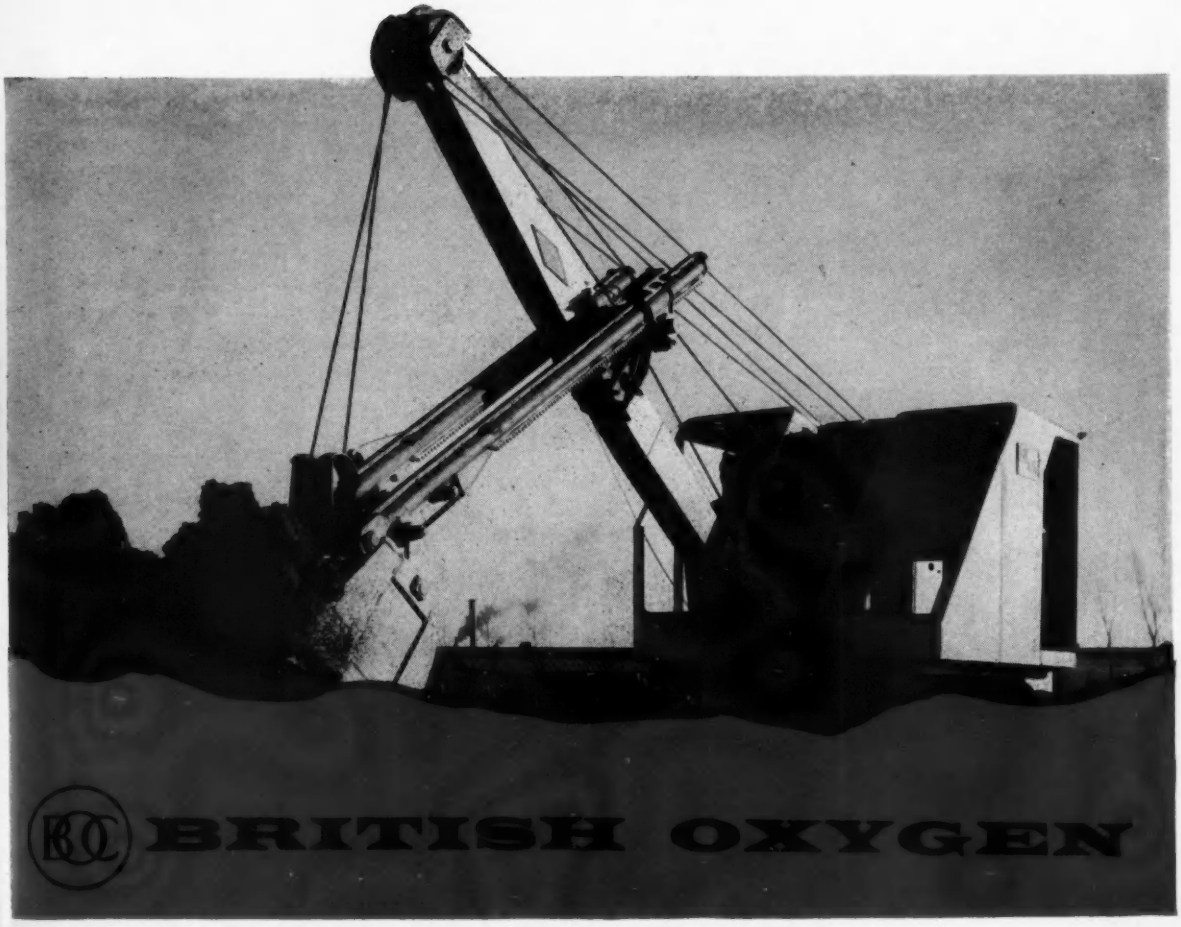

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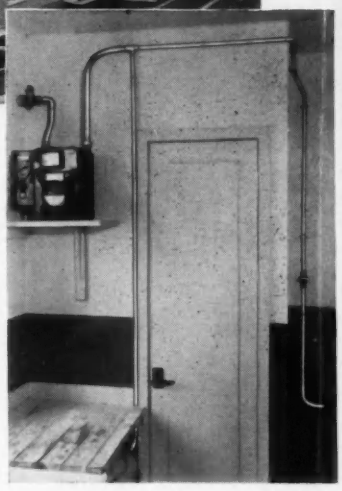

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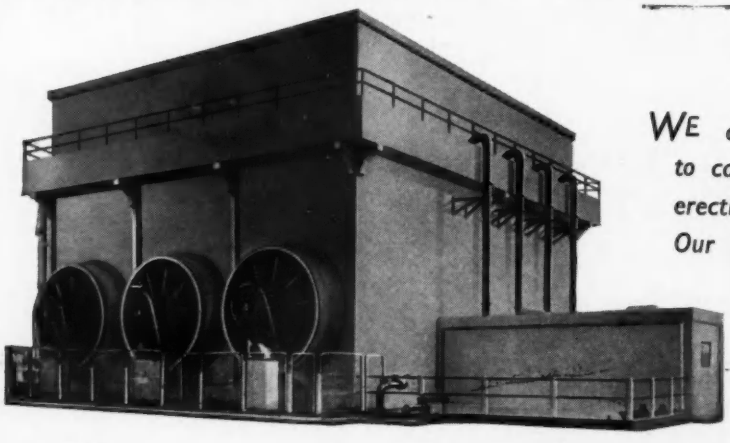

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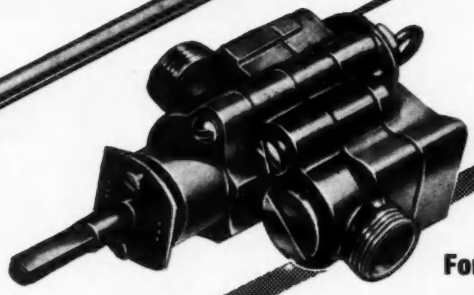

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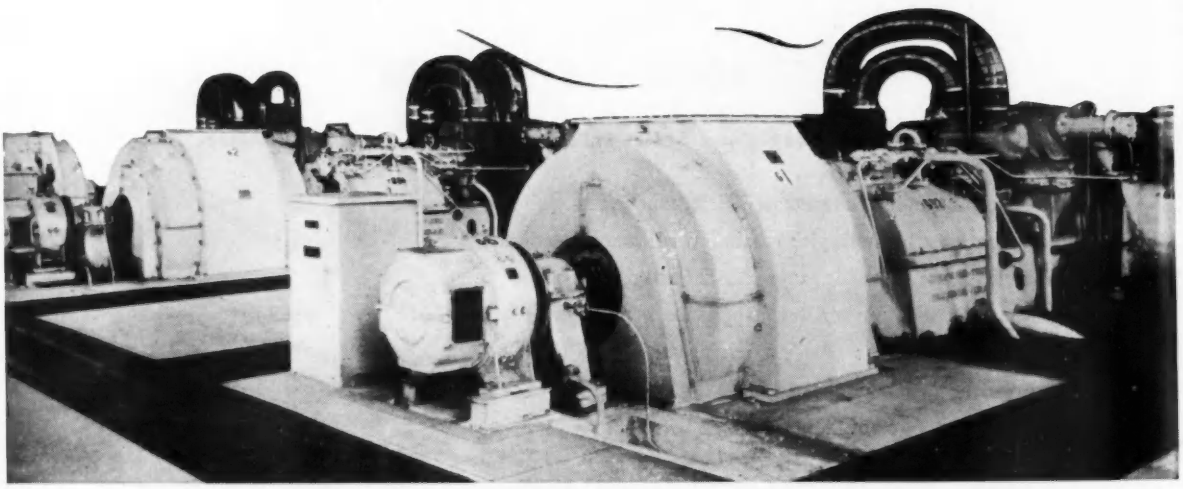

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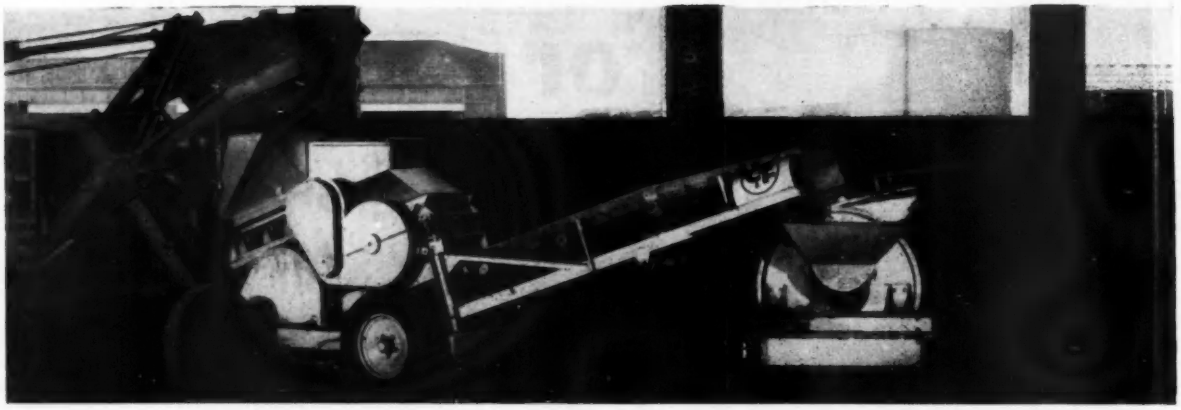

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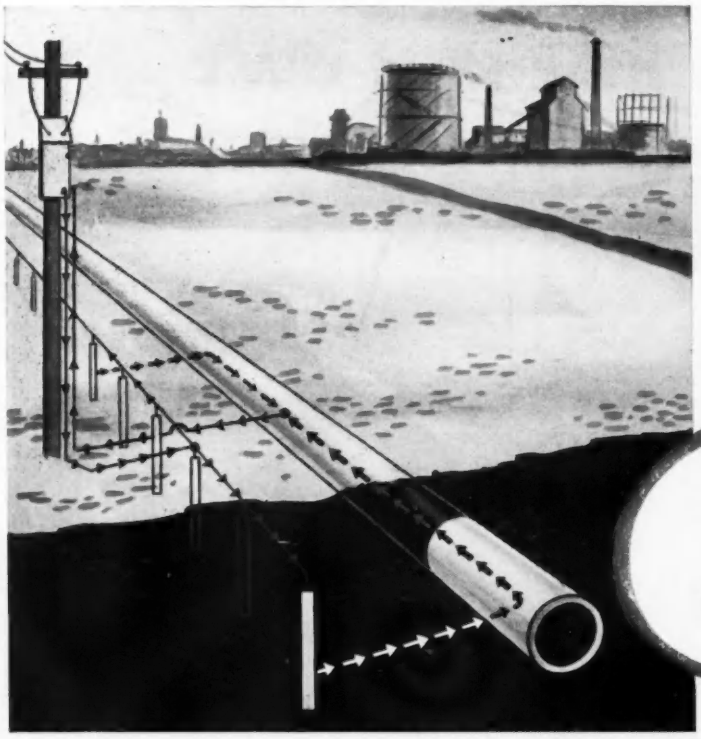

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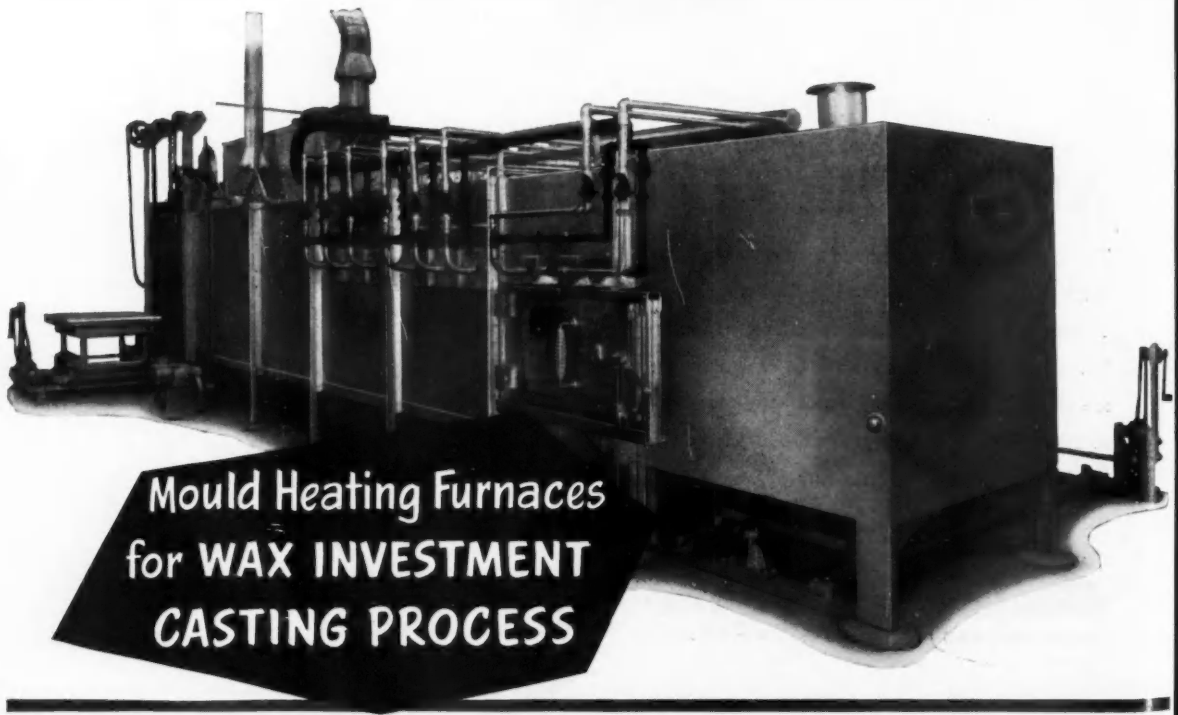

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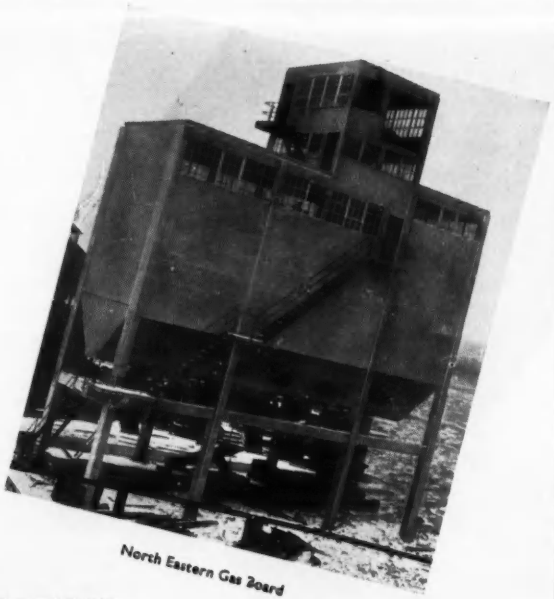

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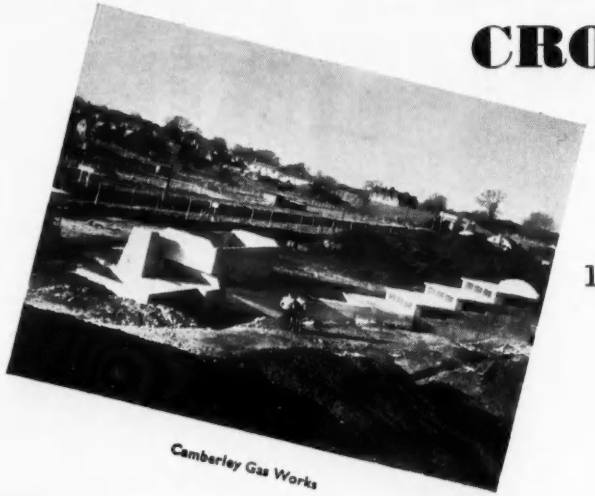

Camberley Gas Works

South Eastern Gas Board

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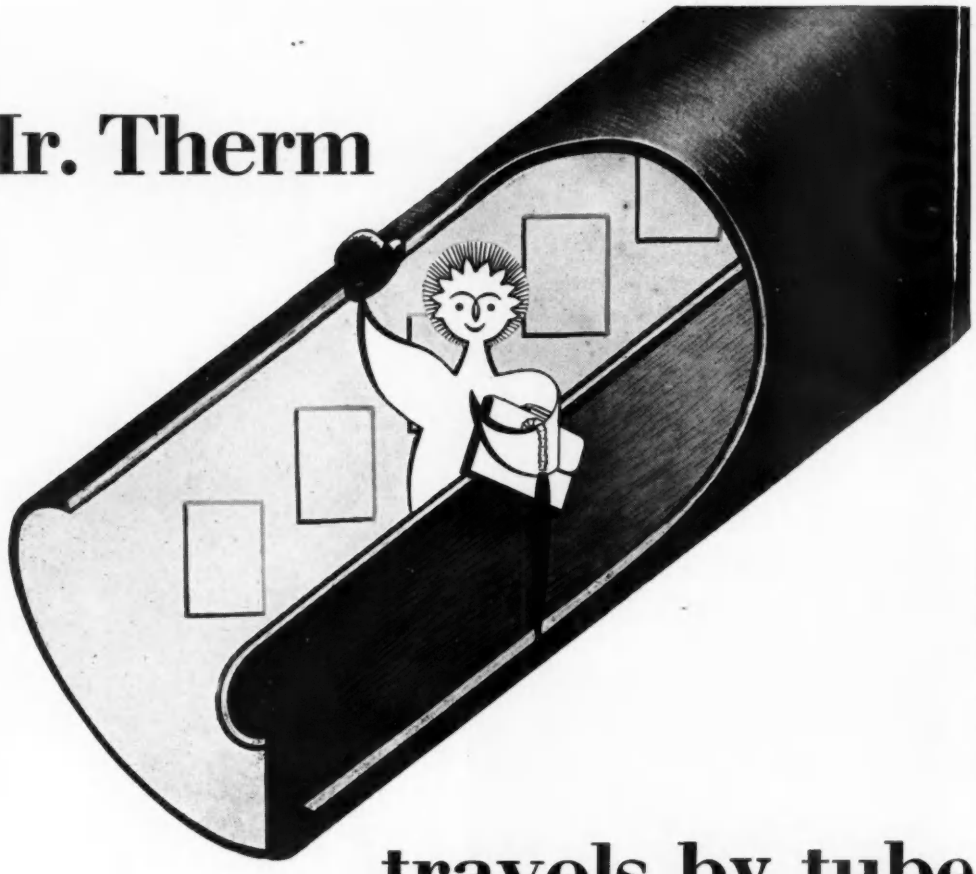

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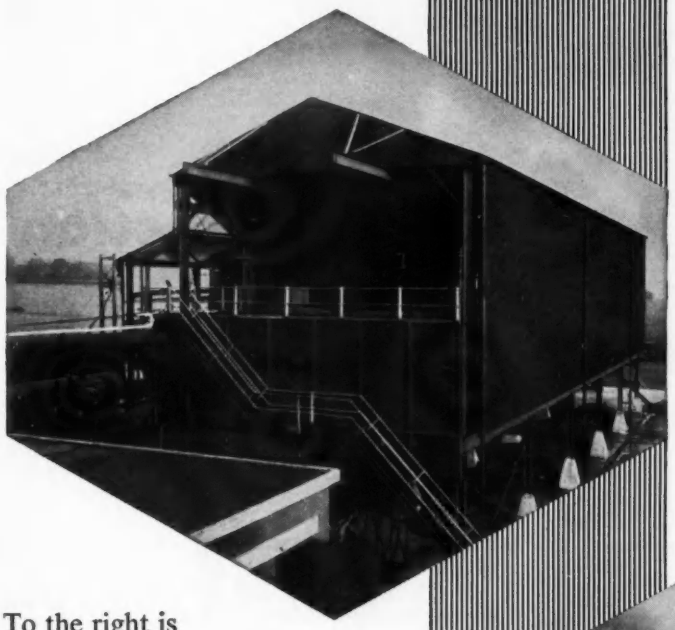
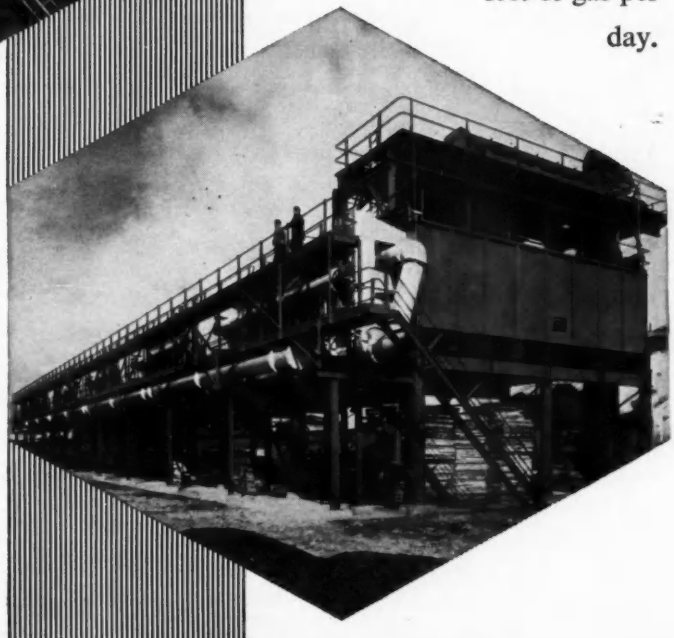
WHESSOE

PURIFIERS FOR THE GAS INDUSTRY



The recently completed installation to the left consists of five welded steel purifier boxes, each 24 ft. by 30 ft. by 10 ft. deep, which were designed, fabricated and erected by Whessoe for the National Coal Board at Stella Gill (Chester-le-Street).

The capacity of this installation is 4 million cubic feet of gas per day.



To the right is illustrated a 6 million cubic feet per day installation designed, fabricated and erected by Whessoe for the North Western Gas Board works at Warrington. It consists of five welded steel boxes, each 45 ft. 9 in. by 35 ft. by 10 ft. deep.

These two installations are examples of the wide range of gas plant made by Whessoe for the gas and coke oven industries.

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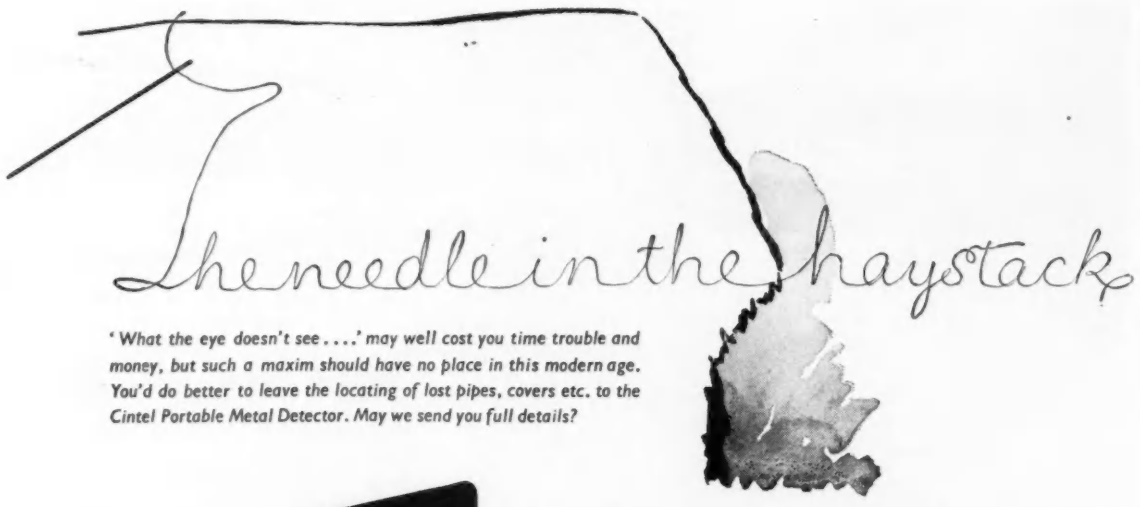

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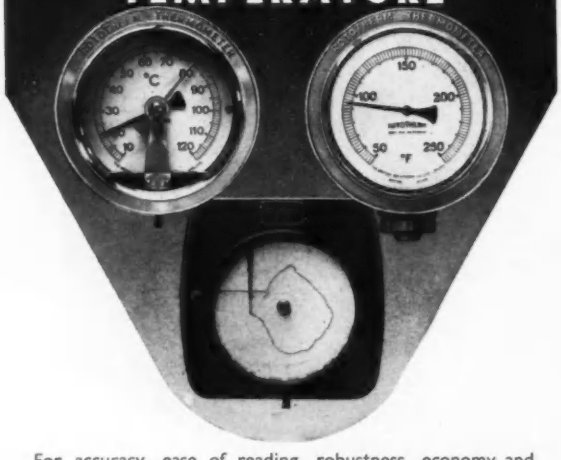

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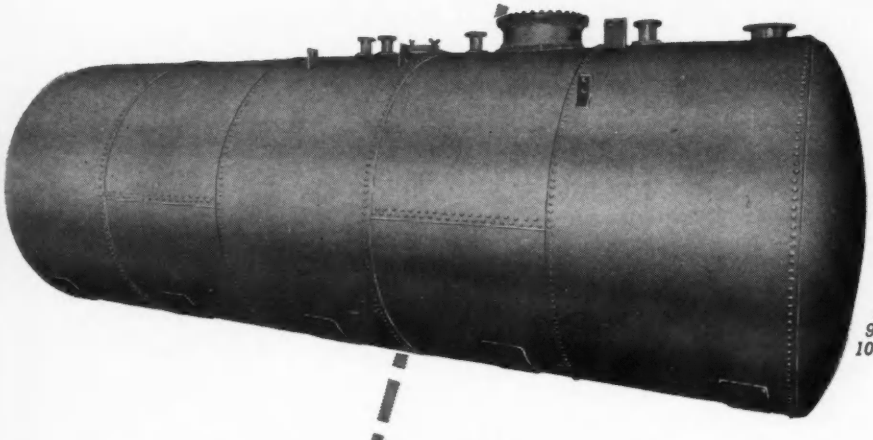

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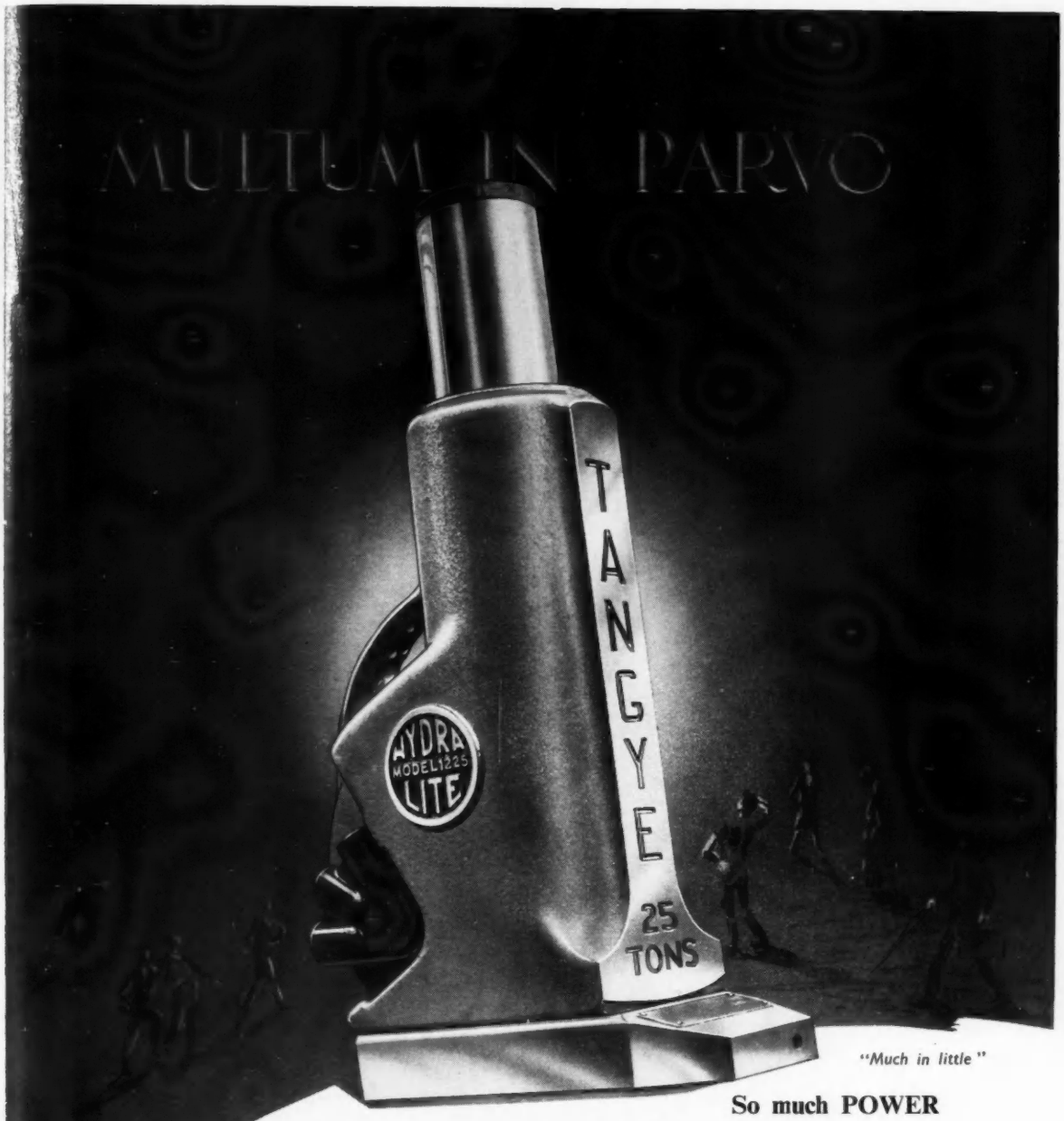

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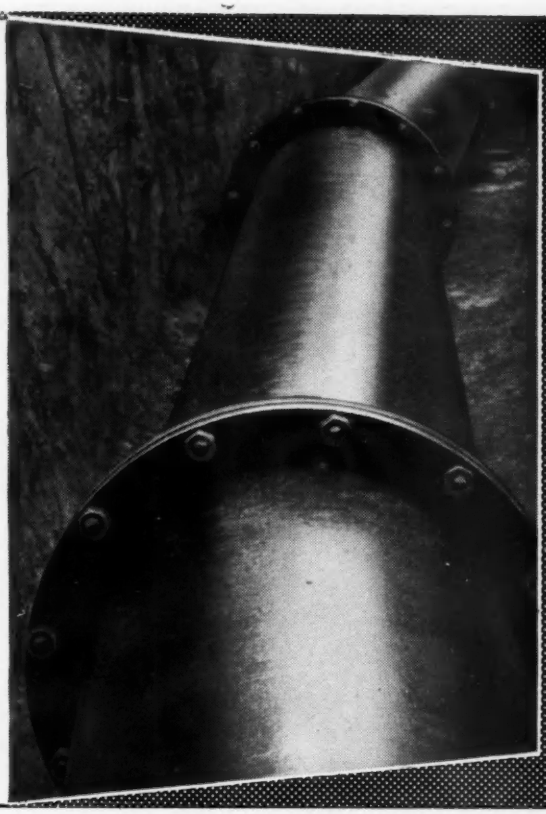

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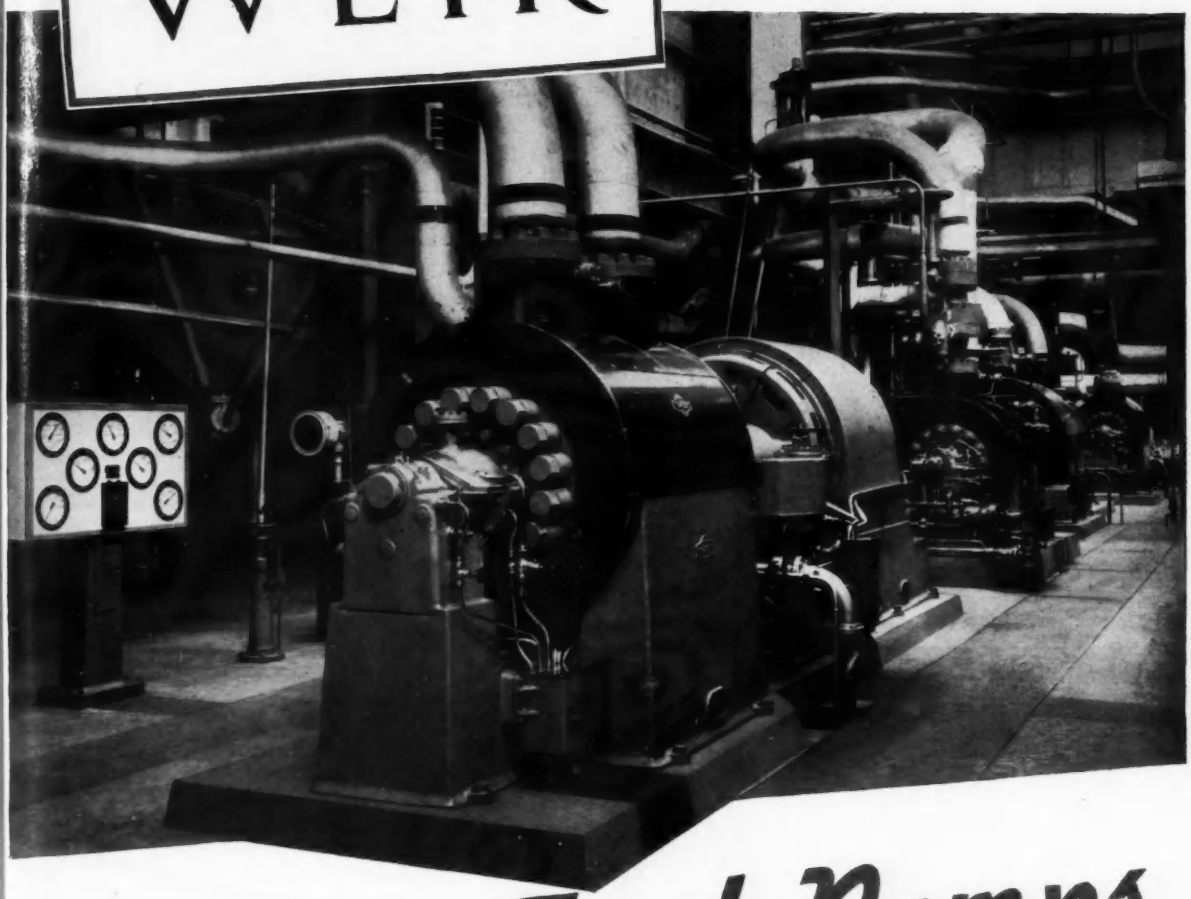

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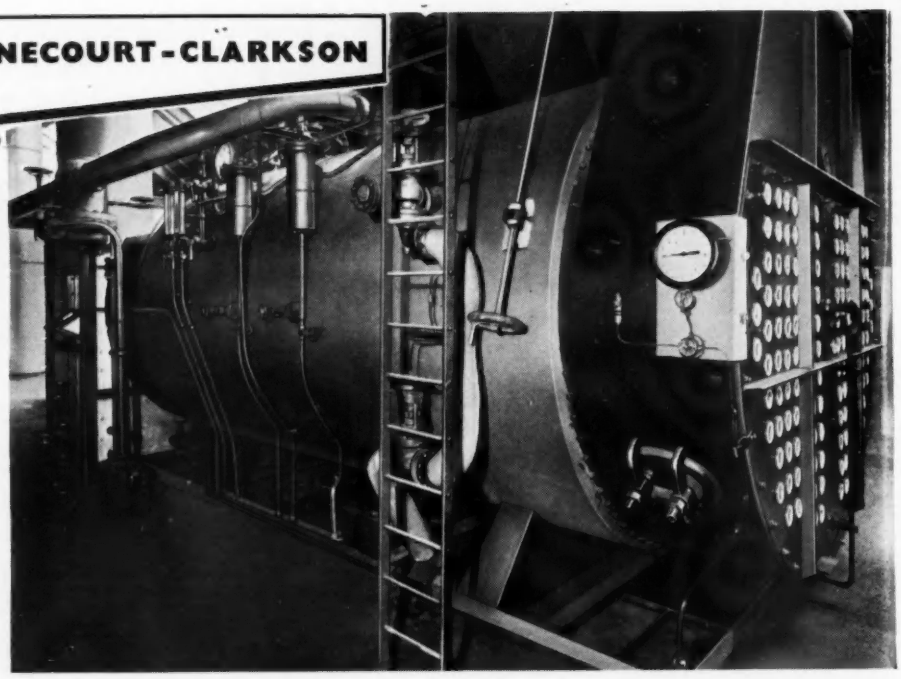

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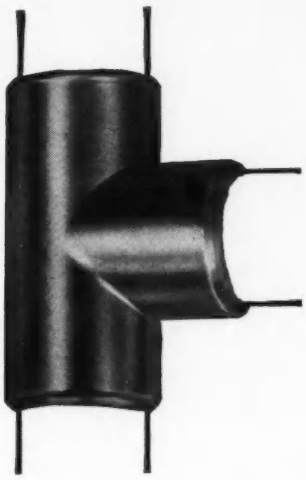

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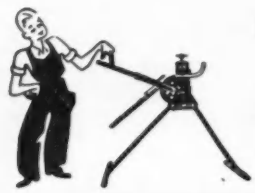

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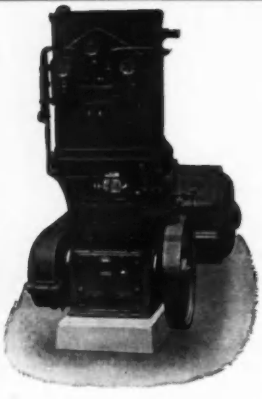

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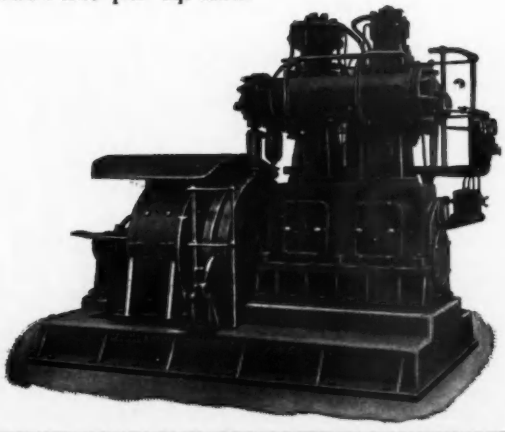

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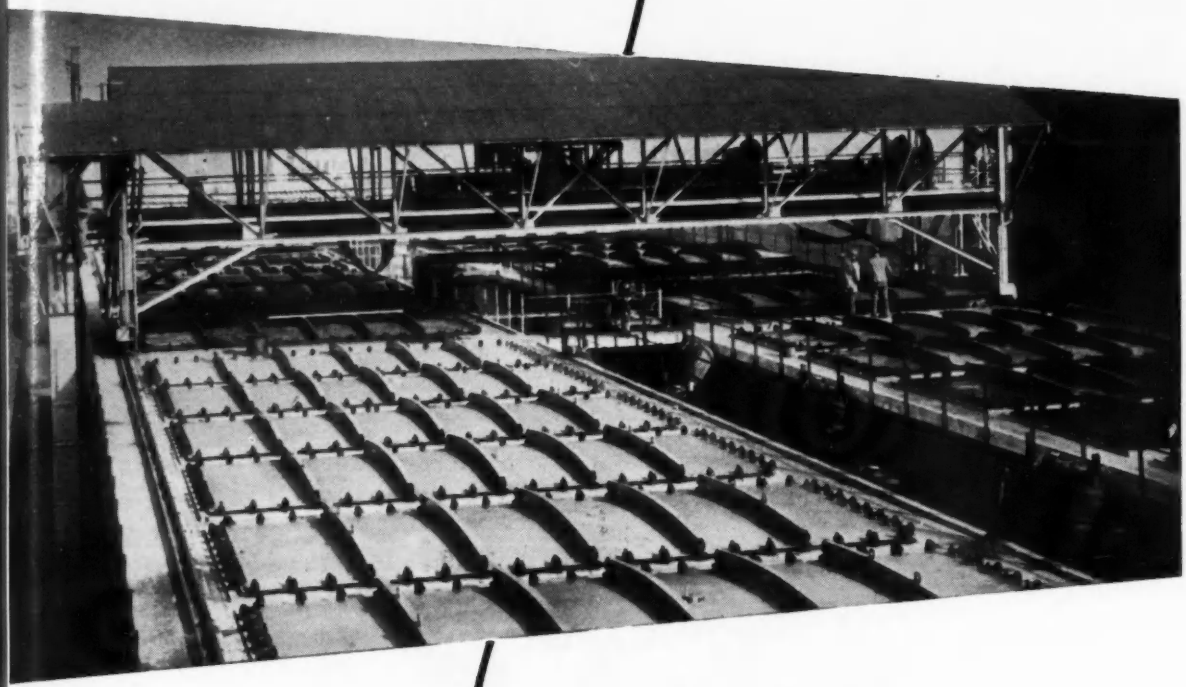

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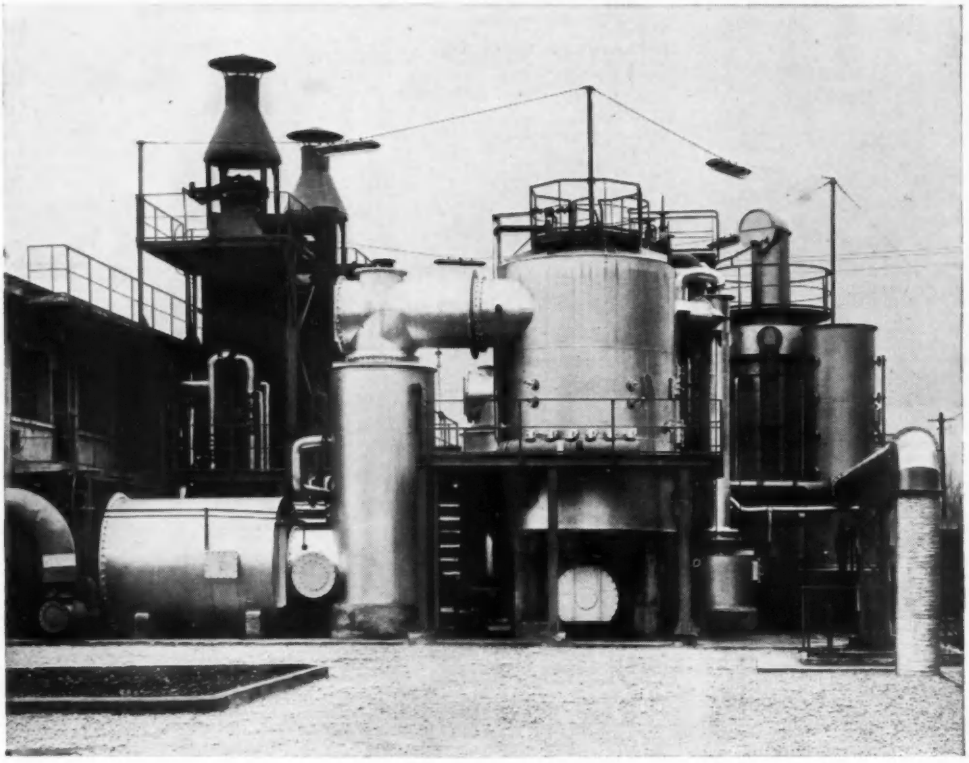

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(April-June, 1955)
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Gas Journal

VOLUME 283. No. 4807. JULY 20, 1955. 107th YEAR

The Domestic Load

THERE was a pretty general feeling among members of the Institution of Gas Engineers at Southsea that the present decline in the domestic demand for gas is serious. It is coming at a time when the gas industry is looking forward, as a result of the implementation of the Beaver Report, to a vast increase in the demand for coke, which demand cannot be met unless an almost proportionately increased quantity of town gas can be sold. We cannot contemplate with equanimity any decrease in any direction whatever. Mr. A. V. Horsfall, in his paper on ' Trends and Influences on the Domestic Load,' confessed that he could find little factual evidence to explain falling domestic consumption. But as Mr. F. Harvey pointed out there is one piece of evidence which is adequate to explain the fall over the limited period, 1949 to date, which Mr. Horsfall surveys. As long as coal and other solid fuels were in short supply, consumers turned to gas, and of course to electricity, often wastefully. But as restrictions on coal were relaxed the open fire and the old kitchen range came back to favour, at least to some extent.

But Mr. Horsfall did examine some of the possible causes for the decline. There was the rise in price. Compared with many other commodities gas prices have not risen proportionately over the 1938 figures. Not that one wants to see them any higher, but the fact is, not that the consumer *can* not afford to pay more for the convenience of town gas for cooking, space heating, water heating, etc., but that he *will* not pay more. What we have to do is to break down a ' sales resistance.' And here we think Mr. Wakeford has put his finger on the major weakness of our sales methods—' the basis of gas charges.' We are hopelessly beaten from the start by the electricity salesman. We come along with a block system in which the first, quite small, block is charged at something like 19d. per therm with a reduction to 17d. for quite a large second block, after which the charge may drop to 15¾d. Such a system has no such appeal as the electricity scale in the same town, which is a fixed charge plus 0.875d. for every unit. No wonder the gas salesman is tired of hearing the prospect say about some additional electrical appliance she has just acquired: ' You see, it costs me less than a penny a unit.' Mr. Wakeford's well set-out argument appears to be unassailable. An attractive two-part tariff is ' the real way to secure the promotion of gas sales to domestic consumers.'

No doubt the replacement of old by modern cookers of improved efficiency has had an effect, temporarily in the wrong direction, but the move of population to the new housing estates has also operated, in too many instances, against us. Too often the instructions of the Minister that all new houses must be so equipped as to give the tenant freedom of choice has been ignored—on the quite understandable ground that to equip for gas as well as electricity is to increase building costs, though the little increase is amply justifiable on the grounds of economy in coal-cost, if only there was a national policy directed to that end. Of the rest of Mr. Horsfall's list, none of which is negligible, only the competition of the electrical immersion water heater stands out, and that is best discussed when considering the paper presented by Mr. W. R. H. Lorimer. The relative sales of gas and electric cookers were analyzed by Mr. L. W. Andrew who cheered us with the news that ' in the London Area, the ratio of 4 : 1 in favour of gas had not been undermined.' It was cheering, too, to read Mr. Horsfall's encouraging outlook on the future of the gas cooker. Ignition is a small point, but important. It is to be hoped that the heated electric filament will be developed. Certainty and safety in operation appear to be its chief merit and one cannot see why the dry battery cannot be used, preferably mounted on the cooker itself. One is glad to see that the full importance of facilities for cleaning is appreciated and that progress is being made in this direction. And Mr. Horsfall's remarks on the possibilities of mounting the pressure cooker integral with the cooker, endorsed as they are by Mr. Andrews, will be read with interest. There is hope too in space heating, in the convector fire, and in the free standing fire, and particularly in the suggestion voiced by Mr. W. G. Phillips, ' to develop a solid fuel grate with back boiler having an integral gas burner attachment for summer water heating, which could be provided at a price competitive with the (electric) immersion heater.' In this direction and those of the flued gas water heaters of the storage type and of the combined washing machine and drying cabinet, with if necessary electrical aids, there is room for progress.

Mr. Horsfall's comments on the Beaver Report and its impact on the gas industry are brief but to the point. We should surely be able to develop a combination of gas and coke, already demonstrably cheaper than any other system of domestic heat supply. Mr. Horsfall

applauds the free-standing open fire as approaching the ideal combination of radiant and convected heat. Possibly if the free-standing openable fire were not so generally ugly in design it might prove an even better combination, especially if water heating were included with it. Mr. Horsfall returns to organic sulphur. To an outsider it might well seem incredible that with so many reasons in favour of the removal of this blemish on gas supply and in view of the relatively light cost of its removal, the adoption of a policy of removal on a national scale should meet with nothing more than a sort of inertia. This was an intensely useful paper and it provided a lively discussion. It revealed possibilities of an increase in domestic sales but not, we think it will be agreed, anything like the overall increase in gas demand which must be created if we are to meet the increasing demand for gas and coke. At the very least, ' efforts must concentrate on selling two appliances where only one was sold before.'

College Opportunities

FOR some years between the wars the London and Southern Junior Gas Association held its regular meetings at what is now the Westminster Technical College, and many young gas engineers were able to see something of the educational work carried on there as a result of helpful co-operation between the Gas Light and Coke Company and the College authorities. A percentage of them had in fact been students at the College and had first hand knowledge of the beneficial effects of courses which had started as early as 1908. With the passing of the years we have paid increasing lip service to the importance of education in the gas industry, and practical effect has been given to the urge for improved facilities by the completion of new extensions in the Department of Mechanical and Gas Engineering at Westminster. The North Thames Gas Board has carried on the tradition of the Gas Light and Coke Company in contributing not only to the lecturing staff but to the actual equipment of the Department, and the work has the blessing both of the Gas Council and the Institution of Gas Engineers. Last week we had the privilege of looking round the College and seeing the extensions, consisting of a gas laboratory equipped with modern appliances; a heat engines laboratory for instruction in thermo-dynamics and heat engine subjects; a chemical laboratory designed to give practical instruction in the fundamentals of chemistry as applied to gasworks practice; and a library, under the control of a full-time librarian, embracing home and overseas technical journals and text books relating to gas engineering in the widest sense.

The enthusiasm of Colonel R. N. Bruce, Staff Controller of the North Thames Gas Board, who is also Vice-Chairman of the Governing Body of the College, was infectious. Both the nationalised supply side of the industry and the appliance manufacturing side are represented on the Governing Body, whose Chairman, Mr. Miles Thornewill, joined in welcoming the visitors, together with Dr. J. N. Long, Principal of the College, Mr. E. J. Gouk, Head of the Department of Mechanical and Gas Engineering, and heads of other departments. Mr. D. M. Holloway, Senior Lecturer in Gas Engineering, was there, together with a considerable number of the evening class lecturers drawn chiefly from the North Thames Board. As will be gathered from the description of the Department which we publish on pp. 197-199 of today's issue of the ' JOURNAL,' we came away from the visit feeling a little prouder than before of the facilities offered to the gas engineer of tomorrow. But our enthusiasm was tempered by the fact that students are not coming forward in numbers sufficient to warrant all the expenditure of time and money that is being incurred. Is it because the gas industry lacks something of the glamour of newer industries—we refrain from using the word ' modern ' because we believe that the gas industry is preserving its modernity in spite of its advancing years—or is it because even now the industry is not offering a financial reward that bears a proper relationship to the responsibilities involved?

Water Pollution

MENTION of the Gas Council's decision to continue work on the problem of sewage containing gas liquors, at Stivichall, is made in the 1954 report of the Director of Water Pollution Research. Under the heading ' Treatment by Biological Filtration of Sewage Containing Gas Liquor,' it is stated that experiments have been continued at Stivichall on the treatment of spent liquor and retort house liquor from the Hinckley gasworks. The spent liquor contains a relatively high concentration of monohydric phenols; the crude retort house liquor contains about half this amount but is rich in ammonium chloride and ammonium thiocyanate, and it also contains comparatively large amounts of higher tar acids.

In another experiment, started in April, 1954, to the settled sewage treated in a filter was added 1% of retort house liquor and to the sewage treated in another filter was added 1% of spent liquor, both from the Hinckley gasworks. There was no substantial difference between the quality of the effluents from the two filters. The period of the experiment was too short to give decisive results, but, ' it is understood that the work is to be continued by the Gas Council,' says the report. Some tables give more detailed information about the experiments. Previous work with small-scale filters at Stivichall, in which had been treated sewage containing various fractions of crude gas liquor from Leeds, had shown the importance of higher phenols and of carboxylic and humic acids, the precise composition of which is not at present known but all of which, it is said, can be extracted with a suitable solvent. The report adds that the greatest effect of treatment of the sewage, however, was given by the residue of the gas liquor after solvent extraction. This residue contained all the ammonia, thiocyanate, thiosulphate, and chloride, besides unidentified substances with a small but significant permanganate value. It was thought that the ammonia in the fraction was an important constituent. It was decided at this point to carry out some further tests on the effect of different fractions of Hinckley retort house liquor on the treatment of sewage. Details of these tests are given in the report. At the conclusion of the section on sewage and gas liquor, it is pointed out that these experiments at Stivichall have emphasized how variable the results may be of treating the same liquid in a series of small filters operated as far a

possible under identical conditions. It is thought that before proceeding further with work of this kind much more information is required on the inherent variability of model filters and it is proposed to carry out an experiment in which 40 similar filters will be operated under conditions as nearly as possible the same, so that the extent of the variability can be examined by statistical methods.

The effluent situation, so far as this industry is concerned, is a constantly recurring headache. Water pollution is not the least of the problems in this connection and it is good to know that the Water Pollution Research Board is ever-vigilant in its laboratory and field work. Its new laboratory at Stevenage came into operation during last summer to provide much better facilities for experimental work than had been available in the five scattered laboratories which it replaced. In other ways, too, the Board's work is expanding; although it is as well to remember that its importance has never been greater than since the realization of the perils of radioactive substances being discharged to rivers and streams. As the report points out, the developments now taking place in the generation of electricity from atomic energy and in the use of radioisotopes will greatly increase the quantities of radioactive materials produced. Gas engineers concerned with problems of effluent will be intensely interested in various sections of the report, obtainable from the Stationery Office, at 3s.

OPERATIVE TRAINING

THE European Productivity Agency, part of the O.E.E.C., is undertaking an investigation into methods of operative training in all types of factory industry in eight European countries. The Ministry of Labour Information Service states that the Agency is hoping to publish a report next year showing the kind of training which is used in different industries and how the suitability of various training methods is affected by circumstances, such as size of firm, type of operation, age of trainee, and so on. Much thought has been given to the training of apprentices but less to the instruction of other operatives below the level of skill for which an apprenticeship is required. Improved training of industrial operatives can increase productivity. By appropriate training the period required for operatives to reach average efficiency has been reduced by a third or more. In addition, operatives have reached a much higher level of performance than before and have been taught to do jobs previously considered beyond their capacity. But it is believed that too little is known about the potential contribution of training to efficiency and that industry would welcome more information. In this country the investigation is being conducted by the National Institute of Industrial Psychology which has also been made responsible for co-ordinating the carrying out of the project in all countries participating in the scheme.

I.C.I. AND NATIONALISATION

AT various times during the last 10 years successive Chairmen of Imperial Chemical Industries, Ltd., have indicated that the Board would resolutely oppose any proposal for the nationalisation of the Company. In recent months the subject has again engaged some public attention; and at a Press Conference on the annual accounts for 1954, Dr. Alexander Fleck made a statement, in reply to a request, giving the Board's views on what the Labour Party had said about nationalising a section of the chemical industry.

Much has been written and still more said on this subject, but in his speech at the annual meeting of I.C.I., Ltd., Dr. Fleck said he thought it might be of interest to many stockholders to read his statement in its entirety, and he therefore proposed, when his speech at that meeting was circulated to all stockholders, to attach to it a copy of that Press statement. One of the aspects dealt with in it was the accountability of management; and he made no apology for again emphasizing that it was, and would continue to be, the desire and aim of the Board and of those senior staff, who were also concerned in the formulation of the Company's policy, to serve efficiently, fairly, and responsibly the interests of the Company's customers, its stockholders and its employees, with constant regard to the national interests as a whole. He believed that policy was effectively illustrated in the report for 1954.

RATES STILL RISING

MUNICIPAL rates are still rising, but not quite at the same pace as in recent years, according to the 10th annual *Return of Rates* (and rates levied per head of population in England and Wales) for 1955-56 published by the Institute of Municipal Treasurers and Accountants. The return follows substantially the form of previous tabulations which have included the data formerly published in the returns prepared separately by the Borough Treasurers of Preston and Chesterfield. Before nationalisation the return revealed the effects on the rates of profits and losses incurred in municipal gas undertakings, but nowadays the trading undertakings are limited to markets and abattoirs, civic restaurants, water, transport, cemeteries, estates, and 'other undertakings.' The return is in two sections, of which the first contains particulars of rates levied and the second shows details of rates levied per head of population. The figures relate to all county boroughs and metropolitan boroughs, and a representative selection of non-county boroughs, urban districts and rural districts. In all, 614 authorities are represented. At the foot of the pages relating to each class of authority, averages are given for all the authorities within that class for both 1954-55 and 1955-56. Averages for the two years for rural districts should be compared with caution as the present return includes twice as many authorities as were included in the figures for 1954-55. Summary tables are given at the front of the book, relating to average rates levied and average rates levied per head of population. Average rates levied in county boroughs for 1955-56 amount to 23s. 4d. (an increase of 2d. over the year 1954-55); in metropolitan boroughs 20s. 8d. (an increase of 1d.); non-county boroughs 23s. 11d. an increase of 2d.); urban districts 24s. (an increase of 1d.); and rural districts 22s. 6d. (an increase of 4d.). A higher rate than last year is required for nearly every service, but, except in the case of education, the average increases are very small. Education continues to be the biggest charge on the ratepayer, but police and highways also take a very large proportion of the rate. Copies of the return are obtainable from the Secretary of the Institute at 1, Buckingham Place, S.W.1, at 7s. 6d., post free.

ALLOTMENT OF BRITISH GAS STOCK

Lists for the new issue of £100 mill. British Gas 4% Guaranteed Stock, 1969-72, at a price of £98%, were opened last Thursday morning and remained open for the duration of banking hours. Applications for amounts of stock up to and including £100,000 were allotted in full, and applicants for larger amounts received about 93% of the amount applied for. Allotment letters were posted by the Bank of England the same evening.

Personal Notes

MR. JACK BATES, formerly of Boston, and at present Deputy Group Engineer and Manager of the Redditch Group, West Midlands Gas Board, has been appointed Group Engineer and Manager with effect from October 1.

MR. A. W. HANSON, until recently Manager of the Karachi office of Babcock and Wilcox, Ltd., has been appointed by the Company to the Managership of its Newcastle office. MR. P. R. BETTLE is his Deputy. Mr. Hanson was formerly Chief Inspector of Boilers to the Burma Government, and joined the Service Department of Babcock and Wilcox, Ltd., in 1946. He opened up the Karachi office in 1949.

MR. J. DAVIDSON PRATT, C.B.E. (Director), and Mr. A. J. HOLDEN, B.SC., (Manager), have been presented with inscribed gold wrist-watches, to mark 27 years of service with the Association of British Chemical Manufacturers. Mr. Davidson Pratt was Chief Superintendent, Chemical Defence Research Department, War Office, when he was appointed General Manager of the Association in succession to Mr. W. J. Woolcock in 1928. In the same year he invited Mr. Holden, who had been one of his technical assistants at Grosvenor Gardens, to join him.

MR. J. MURRAY GRAMMER, Controller of Services to the North Thames Gas Board and previously for six years Stores Buyer to the Board, has been appointed by the National Coal Board as Director-General of its Purchasing and Stores Department. The post is a new one and was recommended by the Advisory Committee on the Board's organization presided over by Sir Alexander Fleck. Mr. Grammer started his career as an articled staff pupil with the Gas Light and Coke Company in 1928 and after four years on the gas supply side, was posted to the special services section and later to Camden Town as Service Supervisor. From 1936 to 1939 he was Deputy Officer-in-Charge of the Company's training, and during this period was Senior Lecturer in Gas Engineering (Supply) at Westminster Technical College, where he also taught after the war. In 1939, Mr. Grammer was Service Manager to the Company's Eastern Division, but on the outbreak of war was seconded to the Distribution Department. He joined up in R.E.M.E. in 1941 and attained the rank of Major and General Staff Officer II. While on demobilisation leave in 1946 he was called to the Bar at the Inner Temple. On his return to the Gas Light and Coke Company, Mr. Grammer was appointed Service Manager with the Central Division, transferred as Deputy Stores Buyer in 1947, and was appointed Stores Buyer, which position he continued to hold in the North Thames Gas Board. He was appointed Controller of Services early this year. During 1954 and 1955, Mr. Grammer has been Chairman of the London branch of the Purchasing Officers' Association and is a member of that organization's Council and National Education and Economic Survey Committees.

MR. F. J. ROGERS, formerly Manager of Radiation Group Sales, Ltd., for the North Eastern Gas Board area, retired from the service of the Company on May 31. Mr. Rogers joined Arden Hill & Co., in 1909 and was Sales Manager in 1950 when Radiation Group Sales, Ltd., was formed. He was then appointed Manager for the North Eastern Gas Board area. MR. FRANK HARPER, hitherto Manager for the Northern area, has been appointed Manager for the North Eastern area; and MR. FRANCIS BROOKE, formerly Sales Representative for the North Western area, succeeds Mr. Harper as manager for the Northern area. MR. D. W. ROUND, of the Radiation Technical Service Department, has been appointed Sales Representative for the North Western area.

MR. J. O. BLAIR-CUNYNGHAME, O.B.E., Chief Personnel Officer of British Overseas Airways Corporation, has accepted the appointment of Director-General of the Staff Department of the National Coal Board. The post, which is a new one, was one of the recommendations in the report of the Advisory Committee on Organization under the Chairmanship of Dr. Alexander Fleck. Mr. Blair-Cunynghame has been Chief Personnel Officer of B.O.A.C. since 1947 and has been directly responsible to the Chairman, Sir Miles Thomas, since 1948 for the whole field of personnel policy. He will take up his new duties with the National Coal Board in the middle of September. He will be succeeded at B.O.A.C. by MR. H. C. SPEAR, now Deputy Chief Personnel Officer.

Obituary

MR. HERBERT J. JARMAN, formerly secretary for many years of the old Grantham Gas Company, has died suddenly at his home at the age of 71. When he retired he had been with the Company for over 50 years.

MR. H. CARL WOLF, for many years a prominent executive in the American gas industry, died on June 26, aged 63. He served as Chief Engineer of the Public Service Commission of Maryland, and later joined Central Public Service Corporation in Indiana. He became Vice-President of the Consolidated Electric and Gas Company, and then was elected President of Central Indiana Gas Company, Muncie, Ind., and all its associated companies. In 1938, Mr. Wolf became President of the Atlanta Gas Light Company, Georgia, and its affiliated companies. After serving as a Director and as Chairman of its National Advertising Committee, Mr. Wolf was elected Managing Director of the American Gas Association in October, 1945. Ill health caused Mr. Wolf to take leave of absence from his duties about a year ago. He tendered his resignation earlier this year but was retained as a consultant to the Association. Last spring the Board of A.G.A. gave him a testimonial dinner as a tribute to his long and important contributions to the gas industry. Mr Banks (president, American Gas Association) writes: 'The gas industry has experienced a great loss through the death of H. Carl Wolf. His life was dedicated to the advancement of our industry through improving the services of the American Gas Association and its member companies. That was his ambition when he was elected Managing Director in 1945. The history of the Association since then reflects great progress toward the achievement of his goal. We know it remained his ideal until he died. His many friends and associates will always remember him for his tremendous ability and his devotion to the highest ideals.'

Diary

July 21.—London and Counties Coke Sales Circle: All-day visit to Swindon, where members will see Swindon gasworks in the morning and tour the workshops of British Railways in the afternoon.

July 22.—BRITISH GAS STAFF ASSOCIATION: Opening of new headquarters, 34, Gloucester Gardens, Bishops Bridge Road, W.2, by the Mayor of Paddington, 3 p.m.

July 25.—EASTERN G.C.C.: Criterion Restaurant, Piccadilly Circus, W.1, 2 p.m.

July 28.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, W.C.2, 2.30 p.m.

September 12-14.—GAS COUNCIL: Gas Sales and Service Conference. 'Heads of Ayr' Holiday Camp, Ayr. (For final draft programme see p. 209.)

Lighter Flints to the value of about £1,000 were reported to have been stolen from the factory of British Flint & Cerium Manufacturers, Ltd., at Vale Road East, Tonbridge, Kent, when it was broken into on Sunday night, July 10. The Managing Director, Mr. D. Wood, says these flints might be offered for sale in 'various markets.'

The United Commercial Travellers' Association of Great Britain and Ireland (U.K.C.T.A.) Incorporated announce the successful completion of their examinations in salesmanship. The examinations were held at 24 centres in London and the Provinces, the total number of candidates being 350. The examinations have now been conducted by the Association since 1950. Copies of the syllabus and examination regulations can be obtained from the General Secretary of the Association at 180, Tottenham Court Road, London, W.1.

Gas Studies at Westminster Technical College

MR. HENRY F. H. JONES, Deputy Chairman of the Gas Council, Mr. V. K. Hutchison, President of the Institution of Gas Engineers and Chairman of the South Eastern Gas Board, with the Chairmen, Deputy Chairmen, and members of other area boards, together with Colonel R. N. Bruce, Staff Controller of the North Thames Gas Board, who is also Vice-Chairman of the Governing Body of the College, representatives of the Gas Press, and others concerned with education in the gas industry spent a very interesting afternoon on July 11 inspecting the Westminster Technical College which, since 1908, has been directly linked with the gas industry. In that year, in co-operation with the Gas Light and Coke Company, courses of instruction in gas supply and the training of gas fitter apprentices were inaugurated.

Recently new extensions to the Department of Mechanical and Gas Engineering have been completed. They are a gas laboratory, equipped with modern appliances for the use of students qualifying for the Higher National and City and Guilds Certificates in gas engineering subjects; a heat engines laboratory for instruction in thermo-dynamics and heat engine subjects for National Certificate schemes; a chemical laboratory designed to give practical instruction in the fundamentals of chemistry as they are applied to gasworks practice, examples being the analysis of gas and products of combustion; and a library consisting of a comprehensive selection of text books relating to gas engineering in the widest sense. Copies of technical journals, both from this country and abroad, are held by the library, which is open on some evenings each week for the use of evening students; the library is under the control of a full-time librarian.

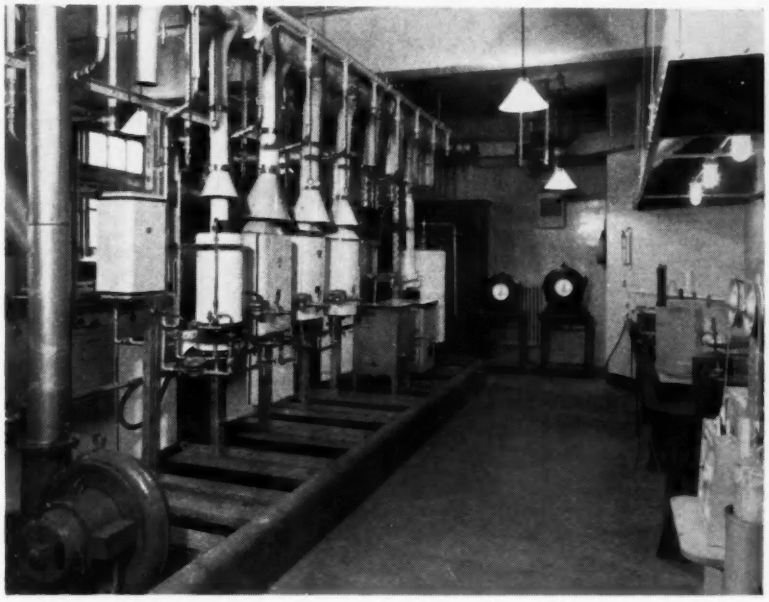


Fig. 1. This is a view of the new gas laboratory showing water heaters mounted on Dexion metal framework in the centre of the laboratory. In the immediate foreground is a motorized fan for raising air pressure in the flue duct to simulate atmospheric conditions likely to be met in practice. Gale conditions can be produced to test the effectiveness of down-draught diverters on the four instantaneous water heaters.

The range of appliances in the gas laboratory will enable instruction to be given in the installation, testing, and maintenance of domestic and non-domestic appliances. The installation was planned, designed, and installed by the staff of the North Thames Gas Board in close collaboration with the staff of the Mechanical and Gas Engineering Department of the College, and the appliances were supplied by the North Thames Gas Board and various appliance manufacturers.

Fig. 1 shows various types of water heaters on which tests are made for thermal efficiency, combustion, and performance of ventilation equipment, the necessary atmospheric conditions for this test being produced by the use of a fan which can be seen in the foreground of the picture.

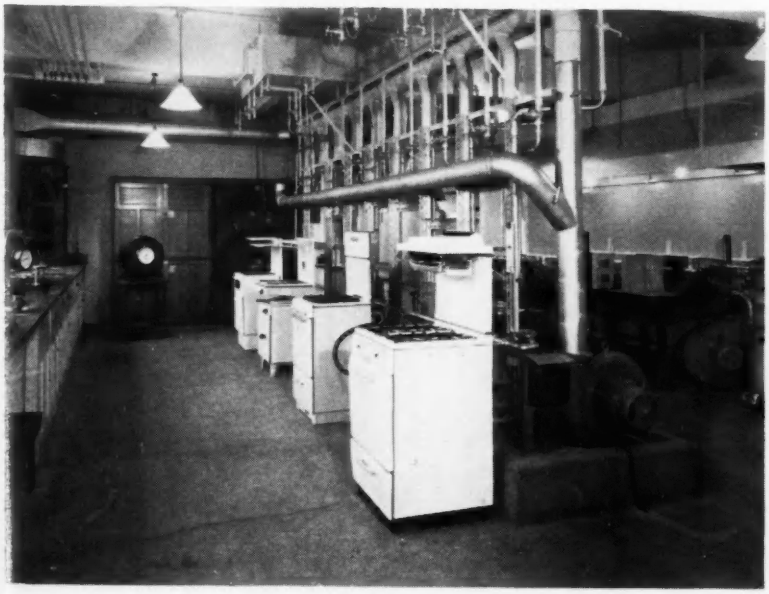


Fig. 2. Centre of the laboratory showing four modern cookers on which tests and experiments are carried out. In the picture can be seen a 6 in. metal trunking used for the measurement of air flow by pitot tube.

On the reverse side of the framework are fitted four cookers of modern design (Fig. 2). Combustion and thermal efficiency tests are made with varying gas pressures, and a large adjustable pressure governor and pressure gauge are also provided for that purpose. There is a 6 in. diameter metal trunking to enable measurement of air flow to be taken by a pitot tube. Air pressure for this purpose is raised by a motor-driven fan, dampers in the flue being arranged for the air to be diverted from one trunking to the other.

A range of industrial burners of various types, with some standard industrial gas appliances, are seen in Fig. 3. Instruction on performance and application and maintenance and testing of these burners is given to the students. The principles employed in the use of natural draught, post-aerated, high pressure gas, and equipment utilizing air under pressure, are fully explained. Instruction is also given in the appliances that raise the necessary air and gas pres-

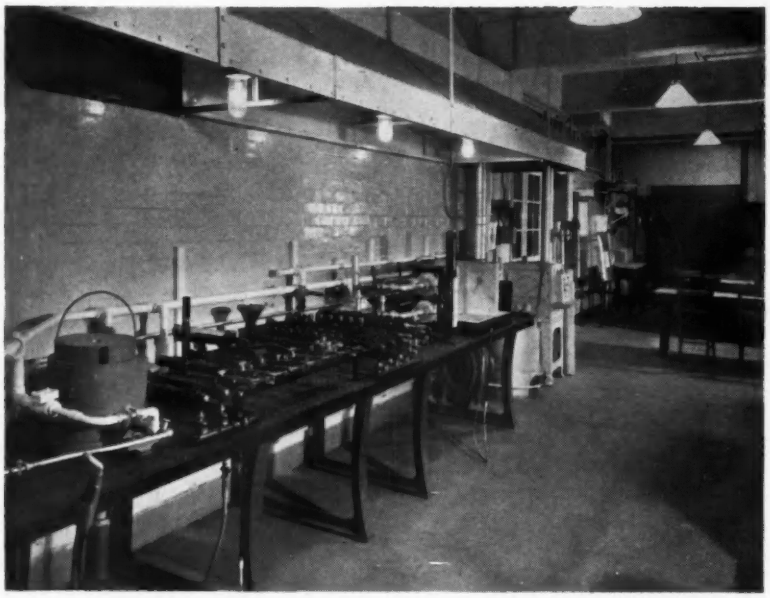


Fig. 3. A view of the east side of the laboratory showing the various types of industrial burners and furnace equipment.

sures. A special feature included in the burner demonstration layout is an air-blast burner unit consisting of two-tunnel type burners fitted with air/gas proportioning device and zero governor. The burners fire on to a refractory screen. One set of burner equipment has the tunnel cut away to show its construction and method of installation. This is the first demonstration unit of its kind installed in a laboratory. The equipment is ventilated by an exhaust fan discharging into the hood, and in the background can be seen a gas fire with a radial arm used for radiant efficiency tests. The other side of the laboratory is used to give instruction in the use of the calorimeter. Appliances for testing for specific gravity and demonstration units of standard combustion safeguard methods are also fitted. Temperature control instruments in various forms are also illustrated in Fig. 4.

Heat Engines Laboratory

The heat engines laboratory was re-equipped at the same time as the gas laboratory for instruction in thermodynamics and heat engine subjects for National Certificate schemes. Fig. 5 illustrates a horizontal gas fired steam boiler fitted with complete protection equipment, including an electronic unit with detector probe in contact with a set of ladder pilot burners. The main burner will not ignite until the automatic control panel operates a solenoid valve on the gas supply. Automatic operation of the boiler is obtained by a pressure-stat on the gas supply which is actuated by the steam pressure. Water feed is maintained by a motorized pump operated from a float switch on the side of the boiler, and audible warning is provided against the risk of pump failure and a low water device terminates the gas supply. Further details of the boiler area:—

Size No.	3B
Dimensions	5ft. 9in. long by 2ft. 9in. diameter.
Burners	38 neat gas jets mounted on vertical ladders and firing concentrically into tubes.
Gas rate	1700 cu. ft. per hour.
Gas pressure	3in. outlet of governor.
Size of gas supply	3 in.
Governor	Constant pressure compensated type.
Evaporation capacity	68 lb. of steam per hour, from and at 212° F.
Steam pressure	120 lb. per sq. in.
Flue stack	40 ft. constructed of asbestone, 10 in. diameter.
Flue draught	0.18 w.g. at base of flue.
Flue temperature	215° F.
Time to reach required steam pressure from initial lighting up	30 minutes.

A vertical two-cylinder compound steam engine which derives its steam from the boiler just described is illustrated in Fig. 6. The equipment and layout of the heat engine laboratory was to the requirements of the Principal and the engineering staff who collaborated with the Chief Engineer's Department, Mechanical Division of the London County Council.

Gas Engineering Courses

The Gas Engineering courses at the College fall into three groups according to the professional qualifications required: (1) Higher National Certificate Course in Civil Engineering (Gas) leading to Associate Membership of the Institution of Gas Engineers; (2) Course for the City and Guilds of London Full Technological Certificate in Gas Technology (Supply), or Gas Technology (Manufacture); and (3) Course for the Institution of Gas Engineers Certificate in Gas Salesmanship and Consumer Service. Details of the courses are as follows:

(1) Higher National Certificate in Civil Engineering (Gas), Students who have obtained an Ordinary National Certificate in Mechanical Engineering may proceed to the following Higher National Certificate Course: Year 1: Gas Manufacture or Gas Supply; Theory of Machines; Mathematics. Year 2: Applied Chemistry I; Engineering Drawing; Gas Manufacture or Gas Supply. Year 3 (H.N.C.): Applied Chemistry II; Thermodynamics and Heat Engines; Gas Manufacture or Gas Supply.

In accordance with the regulations of the Institution of Gas Engineers, holders of the Higher National Certificate, endorsed with the additional subjects of Engineering Materials and Principles of Electricity, may apply for Associate Membership of the Institution of Gas Engineers, providing that an external paper in Gas Engineering is also passed.

Fig. 4. A view of the west side which shows some of the instruments used for demonstrating combustion safeguard and temperature control.

The course also leads to Associate Membership of the Institution of Civil Engineers.

Some gas students may desire to sit for the External Associate Membership Examinations—*i.e.*, for the Joint Part I and the Final Part II, Group VIII. This would particularly apply in cases where the student has already been granted exemption from some of the subjects of these examinations. These students may enrol for such classes of the Higher National Certificate Course as may be best suited to their requirements.

(2) City and Guilds of London Institute. Technology of Gas Supply (or Manufacture). This course, which in standard is the nearest current equivalent to the former Ordinary Grade Certificate of the Institution of Gas Engineers, is as follows: 1st Year—Mathematics S.1—Engineering Science S.1—Engineering Drawing S.1. 2nd Year—Mathematics S.2—Engineering Science S.2—Engineering Drawing S.2. 3rd Year—Gas Technology (Supply) Part I (two evenings) or Gas Technology (Manufacture)—Chemistry. 4th Year—Gas Technology (Supply) Part II (two evenings) or Gas Technology (Manufacture).

Manufacture students take Gas Technology (Manufacture) instead of Supply in these classes. Successful students are awarded the Full Technological Certificate of the City and Guilds of London Institute.

(3) Institution of Gas Engineers Certificate in Gas Salesmanship and Consumer Service (Communication No. 420). This course has been organized by the Institution of Gas Engineers to meet the needs of those preparing for careers on the commercial rather than the technical side. The scheme is as follows: 1st Year—Mathematics S.1—Engineering Science S.1—Engineering Drawing S.1. 2nd Year—English S.1—Technology of Gas Supply Part I (two evenings). 3rd Year—Principles and Practice of Salesmanship.

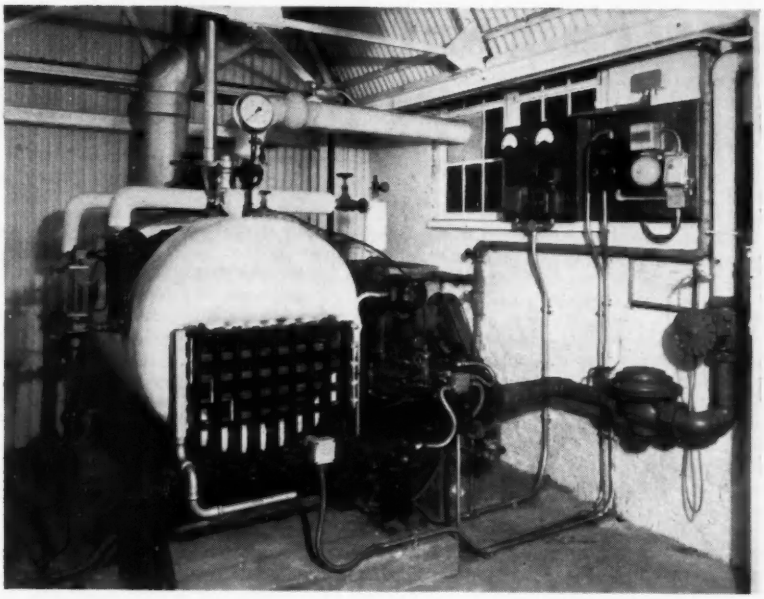


Fig. 5. The boiler house which is adjacent to the newly equipped heat engines laboratory. The control equipment and panels can be clearly seen.

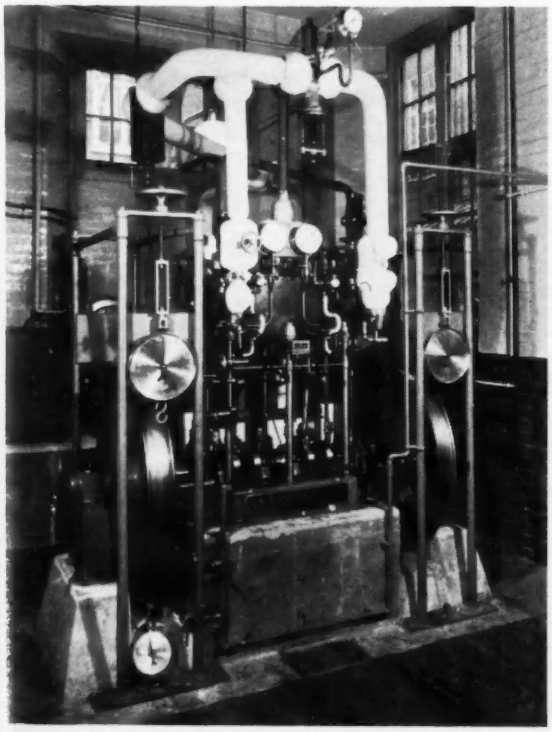


Fig. 6. A front view of the newly installed vertical steam engine occupying part of the heat engines laboratory. Steam for this is provided from the boiler in Fig. 5.

The examination in Technology of Gas Supply is conducted by the City and Guilds of London Institute and consists of Part I only from course (2) above, while the examination in the Principles and Practice of Gas Salesmanship is carried out by examiners appointed by the Sales Training Committee of the Institution of Gas Engineers, who are also responsible for conducting a final oral examination.

Successful candidates are awarded a certificate in Gas Salesmanship and Consumer Service endorsed by the President and Secretary of both the Institution of Gas Engineers and the Gas Council.

Intending students for any of the three courses should consult the Head of the Department of Mechanical and Gas Engineering before deciding on suitable classes, in order that any entitlement to exemption from the first year may be verified—*e.g.*, possession of the General Certificate of Education in certain subjects, or other equivalent qualification, may exempt the student from some or all of the first year subjects.

There are also part-time day classes for the Higher National Certificate in Civil Engineering (Gas), evening classes for the Higher National Certificate in Civil Engineering (Gas), the City and Guilds Technology of Gas Supply or Gas Manufacture, and the Institution of Gas Engineers Certificate in Gas Salesmanship and Consumer Service.

Although outside the exact programme for a visit of gas engineers, the Hotel School at the College was also a source of great interest during the visit. Since 1910 every student who has satisfactorily completed his course of training in the school has been placed in a good post in a hotel or restaurant of the highest class, and many past students now hold important posts of prominence in the hotel industry. In 1932 the Hotel School was enlarged and equipped with modern large-scale apparatus, including cold rooms with refrigerators, larder, two kitchens and pastry room, pantry and silver store, and an excellent students' dining room.

The kitchen equipment in the hotel school has been brought up to date with every form of apparatus for high-class hotel cookery, thus enabling tuition to be given on large type ranges using coal or gas or electricity. The practical instruction is given by professional men with wide experience in all branches of the hotel industry.

Part-time day and evening courses in practical cookery are available for men and women, and, subject to a demand for them, consideration will readily be given to the organization of other courses for special purposes.

Instrumentation and the Gas Industry

PART 3

By A. LINFORD, B.Sc., A.M.I.C.E., and G. C. FARMER, Assoc.M.Inst.Gas E.

(Part 1 was published in the 'JOURNAL' of July 6, and Part 2 on July 13).

STEAM flow metering for the water gas process presents serious problems. As the process is a cyclic one, it is necessary to measure rapidly fluctuating steam flows; the period of the flow may be as short as 24 seconds. Although used on a great many plants, the conventional differential pressure meter, consisting of an orifice plate and 'wet' type (mercury filled 'U 5' tube) registering instrument is insufficiently fast in response to obtain really satisfactory readings. The measuring lag results from the relatively large volume of liquid which must be displaced, coupled with the fact that the steam must be condensed in cooling chambers, fitted adjacent to the tapping points in the steam pipe, so as to ensure that the impulse pipe connections to the registering instrument are always kept full of water. The very large flow rate changes call for a high rate of steam condensation in the cooling chambers, which condition is not easy to achieve in practice. Metering difficulties are not eased by the fact that the modern tendency is to use wet, low pressure steam which has been generated from annular boilers surrounding the generator.

The problem of response can be overcome by utilizing a 'dry'-type registering instrument. That is to say, an instrument with a diaphragm or bellows as the responsive element which has a very small displacement. The latest technique is to use a pneumatic force balance transmitter in conjunction with a pressure measuring instrument which can be graduated in terms of steam quantity.

Essentially, the force balance transmitter is a controlling unit with a proportional-only action, the differential pressure being equivalent to the 'deviation.' Zero differential pressure represents zero deviation and the controlled air pressure output from the unit is 3 lb. per sq. in. Maximum differential pressure represents maximum deviation, under which condition the controlled output air pressure is 15 lb. per sq. in.

Means for accurately estimating steaming figures for up-run and back-run cycles results in a more satisfactory adjustment of the time cycle. However, whether a satisfactory record of steam flow variations can be obtained is very doubtful; when rapid and large flow fluctuations are obtained, the chart record tends to become unintelligible.

Measurement of Air Flow

The measurement of air flow is invariably carried out with a differential pressure form of meter consisting of a differential pressure generating device inserted into the air way, working in conjunction with a differential pressure responsive flow registering instrument.

It has been the practice to utilize an orifice plate for producing the differential pressure, but within recent years wider use has been made of venturi tubes. In view of the low working pressure involved, the venturi tube can be fabricated in light gauge metal. The venturi tube is frequently adopted because it has been found that the saving in boosting costs resulting from the lower permanent pressure drop across the meter outweighs the additional capital expenditure involved.

A variety of registering instruments are available, ranging from the simple form of liquid-filled glass 'U' tube manometer, which gives an indication only of the instantaneous rate of flow, to oil-filled balanced-ring-type instruments specially designed for low pressure gas flow measurement, which can give full scale deflection for a differential head of less than 1 in. W.G. These instruments are available for indicating, recording and integrating the flow. Alternatively, the oil sealed spring controlled bell-type instrument may be used. The ring balance instrument referred to above, has some very interesting characteristics. The deflecting element consists of a hollow ring, with a partition at the top, and this ring is mounted in a vertical plane, on knife edge. The ring is partly filled with oil, the oil seal and the partition dividing the ring into two compartments. The two pressures, the difference of which is to be measured, are applied, respectively, to these two compartments via flexible impulse pipes. By theoretical deduction it may be shown that the deflection of the ring is determined by the magnitude of the differential pressure applied across the partition, the deflection being independent of the specific gravity of the sealing oil and, within wide limits, of the quantity of oil used.

The exact relationship between angle of deflection of the ring and differential pressure is determined by a weight, the turning moment of which balances the turning moment resulting from the differential pressure across the partition. By suspending the weight on a tape cord from a sector forming part of the circumference of a circle, over the limit angular deflection of the ring the angle of deflection is practically directly proportional to the square root of the differential pressure—*i.e.*, practically directly proportional to the rate of flow. Therefore, for all practical purposes, an equally-spaced rate of flow scale and chart results.

Mention may also be made of the differential spring-loaded diaphragm-type rate-of-flow indicator. The operation is similar to that of a draught gauge, the rate of flow being indicated by a pointer on an edgewise scale.

Measurement of Temperature

The measurement and recording of temperatures throughout the water gas process is a highly important matter, both from the point of view of regulation of the time cycle, and for producing ideal cracking conditions in the carburettor and superheater.

The thermocouple type of temperature-detecting element is invariably employed for this application, with a standard form of direct deflection or null balance temperature measuring instruments. Electronic null balance multi-point instruments are widely used since they are capable of recording, in rapid sequence on one chart, the temperatures transmitted from a number of different points.

Gas Mixing Systems

The production of gas in new types of peak load plant and from sources of natural gases, and the purchase of gas from coke oven batteries, have brought about a number of gas mixing problems for the industry. The practice of producer gas and water gas dilution has been carried out without automatic control at most works and it is only since the war and the integration of the gas industry that serious consideration has been given to problems of gas mixing.

The ideal system uses calorific value as its controlling influence, since thermal content is the basis on which gas is sold. Unfortunately, however, automatic control based on calorific value has presented difficulties in the past, and it is only with the development of advanced forms of controlling units in recent years that automatic control in this manner has become a practical proposition. Other systems of gas mixing control are carried out on a basis of proportional volumes.

Gas mixing control in accordance with volume is excellent from the measurement point of view, but it assumes that calorific value of the mixing gases remains constant. In the case of coal gas production, the curve followed by calorific value

and gas volume immediately after a retort has been charged is remarkably similar. On some plants, gas mixing in accordance with a combination of volume and calorific value measurement has resulted in a very close control of calorific value, and a system of this kind has been in operation for more than ten years. A third system, which has been developed on the Continent, employs control by flame characteristic.

The three methods of control mentioned are described in some detail below.

Automatic Control by Calorific Value

A method of gas mixing control, based on calorific value measurement, has been developed in the last few years, employing an inferential type calorimeter consisting of a heat exchanger unit fed by a gas flame, the gas rate of which is controlled to give a heat output which would be proportional

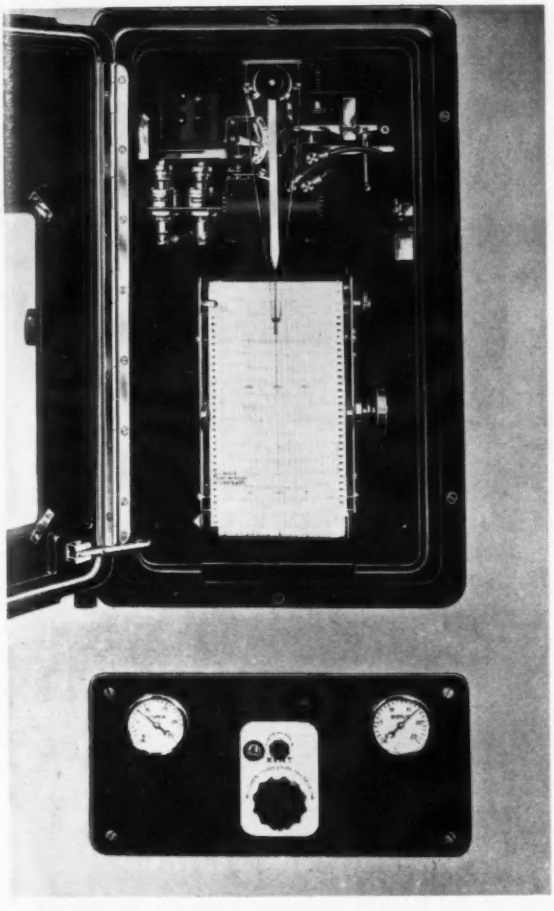


Fig. 17. An inferential calorimeter fitted with pneumatic control
(*Courtesy George Kent Ltd.*)

to that liberated by the gas at standard conditions. The heat exchanger unit comprises two concentric tubes welded together at the lower end, the outer tube being connected to the instrument case. Expansion of the inner tube with respect to the case is magnified by means of a lever system and finally recorded on a time chart. This arrangement makes the heat exchanger unit independent of ambient temperature changes, as an increase or decrease in temperature will affect equally the inner and outer tubes, the burner end of which is free to move without affecting the position of the magnifying linkage.

The calorimeter measures the calorific value of the mixed gases and operates in conjunction with a position balance three term pneumatic controlling unit which is mounted in the instrument case. A pointer indicating the desired calorific value is set manually and the function of the controlling unit is to maintain coincidence between the desired value pointer and the pen recording the actual calorific value of the mixture. The constant calorific value of the gas is maintained by applying the output air pressure from the controlling unit to a servo motor which automatically adjusts a butterfly valve in the diluting or enriching gas main, as the case may be, thereby altering the rate of admission of gas.

Corrected Ratio Mixture Automatic Controller

In this system arrangements are made to measure the flows of coal gas and its diluent and the ratio is selected to produce a calorific value at the desired level. The volume of both gases is measured by differential pressure means—*e.g.*, an orifice plate or a venturi tube is used, and the two differential pressures generated are applied one to each of two diaphragm units. The resultant loads from the two diaphragm units are applied to a pivoted beam which actuates an oil fed pilot valve assembly—a force balance automatic control system is adopted.

In the conventional manner, the pilot valve controls the oil supply to a power cylinder form of regulating unit which actuates a butterfly valve contained in the gas main, through which the flow is to be adjusted. When the desired gas flow ratio exists, the system is in equilibrium. Any deviation from the desired value, occasioned by flow variations, results in a deflection of the pivoted lever, under the influence of which the pilot valve opens the oil supply to the appropriate side of the power cylinder piston and releases the other side to drain. The movement of the piston adjusts the butterfly valve opening and the corrective action continues until the desired equilibrium is restored.

The desired gas volume ratio is established by altering the point of application of pressure of one of the diaphragm units on the pivoted lever. The calorific value of the gas after mixing by the ratio controller is measured by an inferential type of calorimeter, and any departure from the desired calorific value, via a contact mechanism, results in an electrical impulse being transmitted to a reversible electric motor which adjusts the volume ratio setting gear. The duration of the electric signal is proportional to the magnitude of the deviation of the calorific value from the desired level. To reduce pressure loss, a venturi type of differential pressure generating element for flow measurement is frequently used.

Automatic Control by Flame Characteristics

A system of control by flame characteristics has been developed on the Continent since the war, employing, as its measuring element, a bunsen type burner, the air port of which is regulated to keep constant the inner cone height. It is then assumed that the air demanded by the burner for combustion of the gas, which is controlled strictly at a fixed rate, will always remain constant. If the relationship between theoretical air demand and calorific value for a large number of gases of widely differing calorific value is examined, it can be seen that these are almost in strict mathematical proportion. Therefore, if the air demand is kept constant, it can be assumed that the calorific value will be constant.

The controller employs a Bunsen type burner with a capsule containing a volatile substance arranged within the inner cone of the flame. As the cone approaches and recedes from the capsule, the pressure of the volatile substance rises and falls, this pressure being measured by a Bourdon tube. The Bourdon tube readjusts, by means of linkage, the slide controlling the size of the air port. Consequently, as soon as there is an alteration in the cone height, readjustment of the air port is made and the cone returned to its original position. The change in the air port dimension is measured and applied to a hydraulic form of controller—this may be identical in construction and operation with the hydraulic (oil) governors which have already been described and illustrated in diagram form in Fig. 5.

The hydraulic controller repositions the valve regulating the admission of diluting or enriching gas which, in turn, will affect the composition of the gas fed to the burner until eventually the air port dimension will reach its original size and the calorific value of the mixture returned to the desired value.

This is an ingenious form of null balance measurement. It has the advantage of rapid response and low dead time, but

does not correct for changes in specific gravity of the gas and ambient barometric conditions.

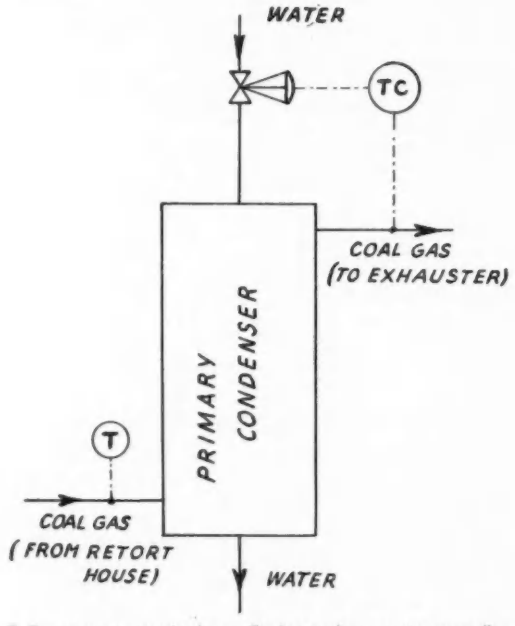
The mercury-in-glass thermometer has for long been employed as a temperature check on gas passing through coolers, both of the atmospheric and the water tube types.

Modern developments in instrumentation in this field include the use of liquid expansion and pressure type temperature measuring units—*i.e.*, mercury-in-steel and vapour pressure thermometers, and also electrical systems, comprising resistance thermometers and thermo-electric pyrometers. The electrical systems lend themselves very conveniently to the inclusion of warning devices giving visual or audible indication when the permissible temperature range has been exceeded.

On large plants, in recent years automatic control of cooling water has been adopted, the temperature measuring system usually working in conjunction with a pneumatic type of controlling unit. As wide load change variations have sometimes to be accommodated, to avoid offset almost invariably a two-term control action is used.

INSTRUMENTATION FOR EXHAUSTER HOUSE

The exhauster is often referred to as 'the heart of the gas making process,' and the exhauster house is the natural point at which to assemble all the measuring instruments associated



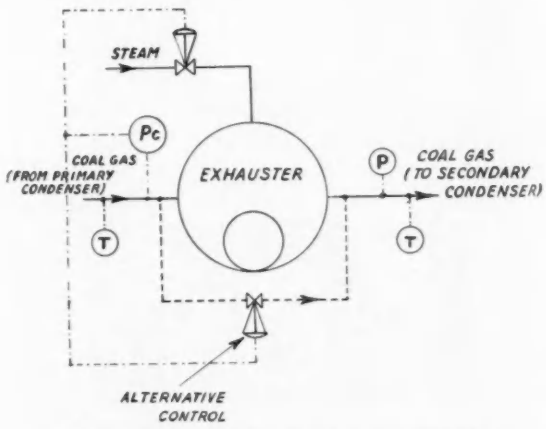
T. Temperature measuring inst. Tc. Automatic temperature controller.

Fig. 18. Primary condenser instrumentation.

with the by-product plant. For example, it is usual to assemble here all the records of pressures throughout the wet and dry purification plant, these giving immediate indication of back pressure changes. A recent advance in this connection is the employment of differential pressure gauges which continuously register the pressure drop over the various items of plant.

The exhausters, whether they be steam, gas or electrically driven, are almost invariably governed automatically in some way, a simple bell governor actuating the steam throttle valve being a common example of exhauster control. The bell is arranged to measure the suction at the exhauster inlet and is often weight loaded, the magnitude of the weight being determined from the loading of the plant. Recently, hydraulic and pneumatic systems of control have been applied to this problem and have resulted in considerable economies in power usage, notably in the reduction of steam consumption, both with reciprocating and turbo exhausters. The measuring and control equipment used is identical in type with that described for retort house governors under 'Instrumentation for the Carbonizing Process,' and the range is selected to accommodate the suction required.

Fig. 19. Condenser instrument panel with pneumatically operated temperature control.
(Courtesy South Eastern Gas Board)



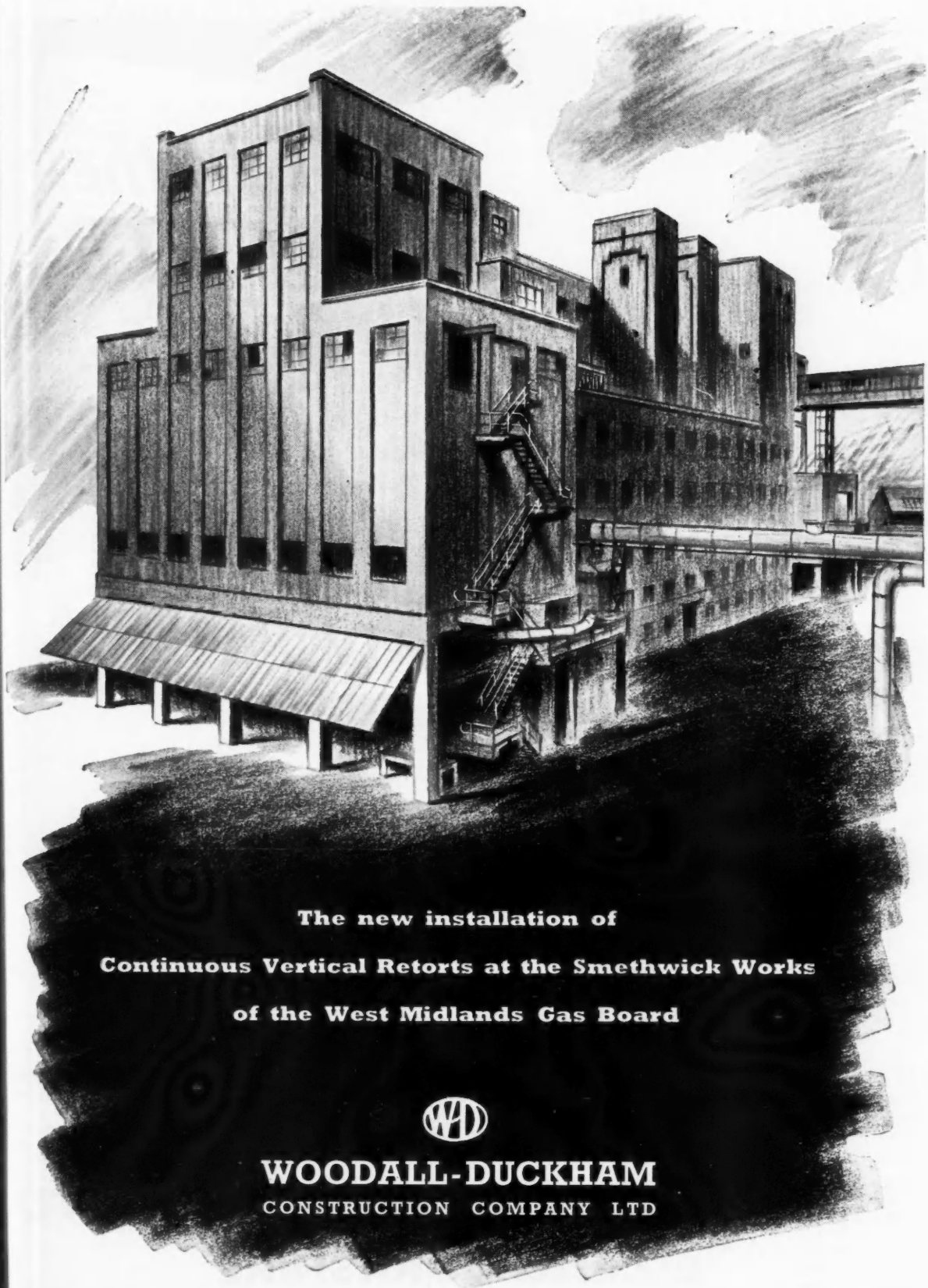
T. Temperature measuring inst. P. Pressure measuring inst.
Pc. Automatic pressure controller.

Fig. 20. Exhauster instrumentation.

INSTRUMENTATION FOR PURIFICATION PLANT

The removal of hydrogen sulphide from town gas has been a problem that has been with the industry from the earliest times. Statutory requirements stipulate that the gas delivered to the consumer must have a very high degree of freedom from hydrogen sulphide, and these stringent requirements have discouraged departures from the long used methods of removal by oxide. Many forms of liquid purification are at present in the pilot plant stage, and instrumentation and automatic control is playing its part in their development. However, the application of modern instrument techniques to oxide purifiers, both of the box and tower types, has led to the use of more precise and scientific control to what was at one time, a 'rule of thumb' process.

(To be continued)



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Darlington Output Trebled in 15 Years*

By CHARLES HINDLE, Northern Gas Board, Darlington

FIVE years ago Mr. F. Wilson, in his Presidential Address to the North of England Gas Managers' Association, said the output of the Darlington undertaking had increased from 684 mill. cu.ft. to 1,654 mill. cu.ft. in 12 years—142%—and the maximum day from 2.8 mill. cu.ft. to 7 mill. cu.ft. Since then the output has continued to increase. In the last financial year the output was 2,177 mill. cu.ft.—an increase of 32% in five years and 218% since 1939. The maximum day has increased to 9.1 mill. cu.ft.

From 1937 until 1946 manufacture of coal gas at Darlington ceased completely. Adequate supplies of coke oven gas were made available from the Brancepeth coke ovens to supply not only the requirements of Darlington, but also the Bishop Auckland and Spennymoor undertakings. Two 1¼ mill. cu.ft. per day C.W.G. plants—later fitted with automatic operators—were installed by the Darlington Corporation, to act as standby plant in case of failure of coke oven supplies. By 1943 these plants were being fairly regularly worked as peak load plant during the winter periods. The rapidly increasing sales were ample evidence that it would be necessary to resume coal gas manufacture, and, in consequence, a thorough overhaul of the G.W. vertical retort house plant and machinery was carried out during 1946. When I arrived in early 1947, four old settings of 33 in. 20 ft. retorts were at work. Two settings of 40 in. retorts were reset during the summer of 1947, and these were put to work the following winter. The daily output from the retort house had now reached 1.9 mill. cu.ft. A further two settings were reset in 1948 and put to work for the winter of 1949. During that winter period eight settings were at work, producing 2½ mill. cu.ft. per day. In the summer of 1950, two new settings of 40 in. retorts, the shells for which were built pre-war, were completed, with new pattern top ironwork, but maintaining worm discharges. These two settings were put to work in October, 1952.

In the meantime, the Darlington Corporation had, in 1949, negotiated a contract with Sadler & Company for a supply of 2 mill. cu.ft. of gas per day from their Randolph coke ovens at Evenwood. Some 13¼ miles of 15 in. main were laid to connect the two works, and the supply was made available, using an initial pressure of 5 lb. per sq. in. in September, 1950. This additional supply of coke oven gas reduced the demand for coal gas although during that winter, 1950-51, four settings were still at work. By the winter of 1952-53, the six settings were working, and, in view of the age and condition of the other four small settings, it was decided that they should be written off. When the Darlington Corporation agreed to the supply of coke oven gas from Randolph coke ovens, it also decided to install a 3 mill. cu.ft. per day fully automatic C.W.G. plant, as insurance against failure of supplies. That plant was completed in 1954, and has worked almost continuously as peak load plant during the past winter.

Gas Purification

The rapidly increasing output has necessitated extensive additions to purification plant. In 1948 a 4 mill. cu.ft. per day W.-WD plate type detarrer was installed together with static washers of the same capacity. The detarrer, which handles coal gas and C.W.G., cannot now deal with all the gas made, and an order has been placed for an additional 6 mill. cu.ft. per day tube type detarrer which should be installed this summer. This, it is expected, will solve our problem of tar deposition on oxide when purifying C.W.G.

By 1953, oxide purifiers were totally inadequate, and during the next year, an additional two boxes were added to a set of three Whessoe all-welded 10 ft. deep boxes which were installed in 1945. Before being extended, these boxes had a rated capacity of 3 mill. cu.ft. per day. This, however, was a doubtful figure, since when emptying a box, only two were left at work, and the throughput which could be obtained through these two was negligible. By the addition of two further boxes, the capacity of the set has been increased to around 5 mill. cu.ft. per day. Since this extension took place it has been necessary, in order to avoid excessive pressures, to work the set continuously on divided flow. The boxes are fitted with Hollis reversing valves which enable the gas to be reversed through each layer, and advantage has been taken of these valves by passing the gas continuously in the top of the upper layer and the bottom of the lower layer, and out of the centre of the box. No difficulties have been encountered and we are carefully recording their performance. It is hoped that, when more information has been collected, some interesting figures may be available for publication

In November, 1954, a set of four all-welded boxes, 35 ft. sq. by 7 ft. deep, complete with mechanical handling equipment and overhead revivifying floor, with a capacity of 3 mill. cu.ft. per day, were put to work by the Board at Randolph coke ovens. After some initial difficulties these are now working satisfactorily. A set of purifiers is at present under construction for the N.C.B. at its Brancepeth coke works, which, it is expected, will be put to work in the near future. When this scheme is completed, ample dry purification plant will be assured at Darlington for some years.

Exhausters

In 1951 a new 200,000 cu.ft. per hour Roots exhauster was installed to replace a four-blade machine of 66,000 cu.ft. per hour capacity. This, together with two further blade type machines, has handled the mixed coal gas and C.W.G. Until 1948, the maximum holder storage at Darlington was 2.2 mill. cu.ft., to deal with a maximum daily output at that time of 7 mill. cu.ft. The position was aggravated by the five-day industrial load, which meant that at week-ends, coke oven gas had to be refused—often in quantities equivalent to two days make of C.W.G. A 3 mill. cu.ft. rivetted holder in welded tank installed at that time did much to relieve the position, but the question of week-end storage is again difficult. A further 3 mill. cu.ft. all-welded holder at present almost completed at Bishop Auckland will go far towards solving this problem.

Increased demands for steam, particularly for town gas compressors, exhausters and C.W.G. plants, overloaded the two existing Lancashire boilers, and the Board, at one of its first meetings in 1949, agreed to the installation of an Economic boiler of 17,500 lb. per hour capacity, complete with sprinkler stokers and fuel and ash handling plant. The installation was commissioned early in 1954. Some difficulties have been encountered with blocked tubes due to the firing of inferior fuel-outcrop with up to 50% below ¼ in. being used—and, bearing in mind maintenance costs, it may well be found to be more economical to use a screened fuel. An overall thermal efficiency of 75% on the gross C.V. of fuel is being obtained continuously, and the cost of steam raised—exclusive of capital charges—is approximately 9s. 6d. per ton.

Distribution System

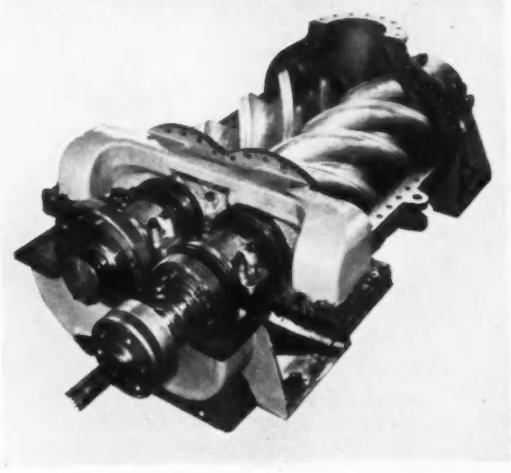
Since 1949 some 1,800 houses have been erected in the Darlington area, and in addition, Newton Aycliffe, then a town only on paper, has grown to over 2,000 houses, complete with shops, schools and other amenities. The Darlington low pressure system is reinforced by a high pressure ring main, feeding back through 15 H.P. governors. Newton Aycliffe and the adjoining North Eastern Trading Estate are, until the commissioning of Bishop Auckland holder, almost completely dependent on high pressure gas supplied by a 6 in. leg from this ring main. In 1954, supplies to the villages of Dinsdale and Middleton-St-George were reinforced by conversion of the existing 8 in. low pressure supply main to medium pressure, necessitating an extension to the H.P. ring main. The small 10,000 cu.ft. balance holder, at Dinsdale, which was in need of resheeting, and which, in any case, did not provide an adequate pressure for the growing district, was scrapped.

Industrial demands for gas continue to increase. In 1939 gas used for industrial purposes represented only 8% of the total gas distributed. For the year ended March 31, 1955,

* From Presidential Address to the seventh annual meeting of the Northern Junior Gas Association.

this demand had increased to 46% of the total. One well-known local firm has scrapped its own producer plant, and converted its equipment to town gas firing, and a second much larger consumer is at present negotiating with the Board on similar lines. This second consumer will, if the conversion proceeds, require some 2 mill. cu.ft. per day. These increased demands have necessitated the laying of an independent high pressure industrial main of some 3,300 yds. of 12 in., 8 in. and 6 in. diameter. It can be operated independently of the district H.P. system should it be found necessary to work at a different pressure. Both mains are now operating on pressures up to 15 lb. per sq. in., the system being designed for, and the compressors capable of, operating at 30 lb. per sq. in.

The maximum hourly demand on the H.P. system is now 300,000 cu.ft. at 15 lb. per sq. in. and the two 50,000 cu.ft. per hour steam driven compressors originally installed in 1936 were augmented in 1948 by a further steam driven unit of 75,000 cu.ft. per hour. In the summer of 1953, an additional machine of 100,000 cu.ft. per hour capacity was added. The Board decided on this occasion to install a Howden compressor, driven by variable speed D.C. motor. The compressor is a development of the Lysholm compressor originally conceived as a component of a gas turbine. It is a positive displacement rotary compressor consisting essentially of two rotors with



The Howden compressor, claimed to be the first of its kind to be installed in this country for town gas compression.

intermeshing helical lobes. These rotors and their synchronizing gears are the only moving parts as there are no valves. Gas enters the spaces formed between the rotors by the parting of the intermeshing lobes at the inlet port and is carried round in these spaces to the discharging side of the machine where the remeshing of the lobes compresses it to a suitable pressure before it is released through the discharge port. This internal compression, which distinguishes the Howden from the Roots type compressor, is an inherent feature, and contributes to its high efficiency at pressure ratios much beyond the practical limits of the Roots-type machine.

The Darlington machine being a prototype, the rotors were machine planed and hand fettled and as a result the aerodynamic performance has been somewhat below that expected, and no operating costs are therefore available. Howdens are at present installing an automatic milling machine which will produce machine milled rotors which will then be supplied for our machine. It is expected that results will then be obtained comparable with Lysholm compressors installed on the Continent which have been working since 1953 and which, according to a paper published by M. P. Riet, Engineer of Roche Maurice in *Journal des Usines a Gaz* of February 15, 1954, are operating at appreciably lower power consumptions than those for rotating vane or piston-type compressors of equivalent capacity.

Since vesting day 65 miles of mains have been laid in the Darlington area, and at Barnard Castle considerable development has also taken place, seven miles of mains having been laid and 360 houses provided with gas for the first time.

Figures published recently by the National Smoke Abatement Society disclosed that Darlington was the cleanest town in the North East, and we in the gas industry should claim at least some of the credit for this achievement, being fortunate in possessing in the area a large variety of industries—from heavy engineering to plastics, and from locomotives to textiles. Almost all turn automatically to gas to solve their heat treatment and space heating problems. Since 1949, no fewer than 540 overhead radiant heaters have been installed for industrial and commercial heating, some 120 central heating boilers or conversions have been put to work, and to date oil has been a serious competitor, in only one or two isolated cases. So long as the price of gas can be maintained in the present ratio to the price of competitive fuels, I do not think we shall, at any rate in this area, lose many loads. Whether the present low price obtained for industrial gas is economic is questionable, particularly when that gas is used only for space heating during winter periods.

Since 1949, coke sales in the Darlington district have increased from 6,215 tons per annum to 8,990 tons—an increase of 45%. These increased sales have made it necessary each year to import supplies from other divisions. The increased transport of coke caused by concentration of manufacturing plant at fewer large units is a problem which demands close attention. In addition to the local sales during the past year 1,700 tons were resold to other units within the Darlington Division.

The Future

Much has been achieved, but as the Darlington demands continue to increase, much remains to be done. By the end of this year it is expected that within the Darlington Division. only Darlington, Leyburn, and Stanhope will remain as manufacturing units. The first stage of this scheme was completed last month, when a bulk supply from Darlington was made available to Richmond and the works closed down. This main is now being extended to Northallerton, Bedale, and Masham. Work has commenced on a 15 in. main which will connect Darlington to the Fishburn-Stockton main of the Tees-side Division. A compressor with a capacity of 200,000 cu.ft. per hour at 30 lb. per sq. in. is to be installed at Darlington, and volumetric governing and metering of the gas in either direction is planned. On the manufacturing side, serious consideration is being given to rebuilding four settings of G.W. vertical retorts with later provision for a further four settings. This rebuild will necessitate extensions to condensing and exhausting plant. A new scheme for coke handling and screening plant is receiving attention. This will replace an extremely small and overworked screening unit, and handling arrangements which were installed as long ago as 1914. Maintenance on this plant is extremely high and efficiency correspondingly low.

Since 1946 carbonization has been limited to about eight months of the year—the retort house being completely shut down during the summer. This is not too happy a position—in addition to the reduced life from the retort settings, serious labour problems arise. Recruitment of suitable labour each year, and the consequent training, is expensive—and often heartbreaking. We look forward to the day when it will be practicable to continue carbonization throughout the year, and so build up a nucleus of trained operators. It would seem that by 1956 this should be achieved.

ATOMIC POWER PLANT GROUP

Three British companies are to operate as a group to undertake complete atomic power projects of the kind employing gas-cooled, graphite-moderated reactors, which are of the class of reactor used at Calder Hall, Britain's first atomic power station. The arrangement means that atomic power stations of this type can be built in any part of the world under a single contract. The members of the group are Babcock & Wilcox, Ltd., the English Electric Co., Ltd., and Taylor Woodrow, Ltd., representing, respectively, steam, electrical, and civil engineering. An announcement by the group states that it is equipped to do everything from preparing the site to feeding electricity into the public supply.

FLAME HARDENING BY OXY-TOWN GAS

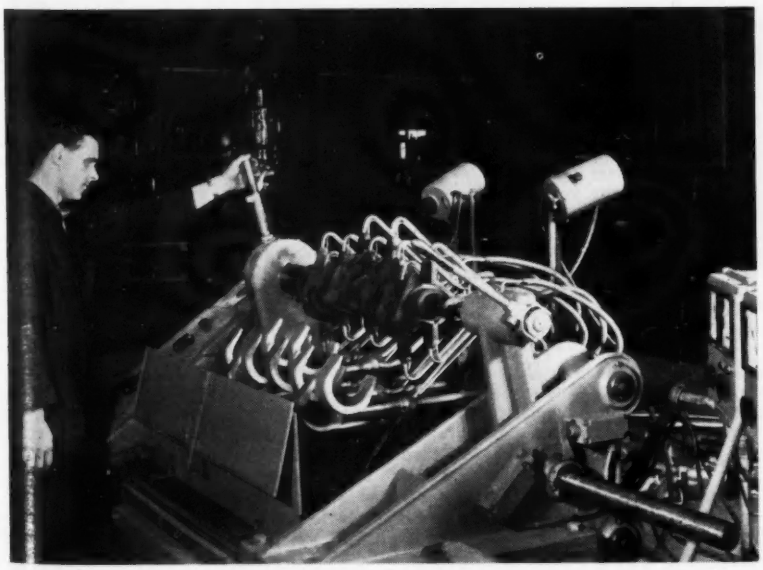
THE East Midlands Gas Board, the Gas Council, Ruston & Hornsby, Ltd., and Surfard, Ltd.—we place them in alphabetical order because they appeared to us to be equally in the picture—were associated in the organization of an unusually interesting Press visit on July 13 to the Lincoln works of Ruston & Hornsby, Ltd., to see in operation the Peddinghaus oxy-town gas plant for flame hardening of crankshafts. The process is an outstanding example of the merits of gas in an essential branch of industry, and the exact controllability of the system has enabled it to supersede earlier and less economical methods of applying gas to the job of flame hardening.

The Peddinghaus oxy-town gas automatic flame hardening machine for crankshafts, showing the shaft in loading position just prior to the operator moving it into the burner unit, where the surface of the pins and journals will be heated for approximately 100 seconds. The temperature for this operation is preset to 810° C. and 'watched' by the Milliscope automatic temperature indicator.

The Peddinghaus system was introduced to Ruston & Hornsby, Ltd., by Mr. K. Hudson, of the Lincoln staff of the East Midlands Gas Board, who had seen it at work in Germany, and its installation at Lincoln followed very full investigation and the treatment of specimens of actual Ruston & Hornsby products on existing plants in Germany. Ruston & Hornsby, Ltd., are among the world's largest diesel engine manufacturers, and the two machines at Lincoln specially designed to apply the oxy-town gas process for simultaneous surface hardening the pins and journals of crankshafts used in their latest design of diesel are the first of their kind in England.

Of the many types of components now being hardened in this country by the oxy-town gas process, crankshafts are, perhaps, the most important. The ever-increasing power output of the diesel throws heavier loads on the pins and journals of the crankshaft. This means that either the bearing surfaces must be increased to resist the extra wear occasioned by the new loads or the shafts must be manufactured from heat-treated alloy steels. Both of these alternatives increase the cost, either because of increased size and weight, or simply because of the higher cost of the alloy steels and increased time in manufacture.

Surface hardening of crankshafts made from steel containing around 0.4% to 0.5% carbon provides a thoroughly satisfactory solution to the problem, and bearing surfaces of pins and journals having a hardness figure of Rockwell C 54-60 are easily obtainable, thus providing a crankshaft having exceptional life and a tough core which has not been affected by through heating.



The crankshaft in the burner unit. The automatic temperature indicator tells the operator the moment to move the shaft into the quenching unit. This has timed quenches in order to leave a pre-determined amount of residual heat to obtain a back-tempering effect.

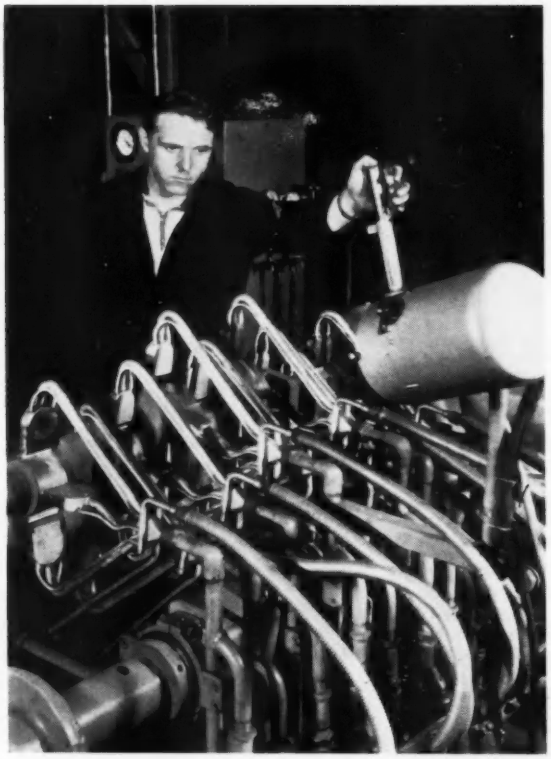
The use of oxy-town gas for flame hardening was initially developed by Peddinghaus of Gevelsberg, Germany, during the war and their plant is being distributed in this country by Surfard, Ltd., of Abbey House, S.W.1, on whose behalf Mr. Leslie Athill and Mr. Derrick Wilson were present at the Press visit and answered questions.

Peddinghaus claim that a mixture of 60 cu.ft. of oxygen to every 100 cu.ft. of town gas provides an ideal fuel, not only because of its low cost but also because it permits a design of burner to give a continuous ribbon of flame as opposed to a series of single jets which might concentrate the heat on to one or more small areas instead of spreading it evenly over the surface of the part being heated. A further important advantage is that practically the whole of the gas is burned at the orifice of the burner, resulting in a small flame of ample temperature for the rapid heating of the surface to be treated. This type of burner is also easily and quickly cleaned.

The heating unit comprises sets of

watercooled copper burners for each crankpin and journal. The burner incorporates three heads with slots to cover the width of the zone to be hardened. In the case of a two-cylinder crankshaft five sets are used, two for the pins and three for the journals, while for a six-cylinder crankshaft thirteen sets are used, six for the pins and seven for the journals. The quenching unit is provided with an equal number of spray quenches. The crankshaft to be hardened, which is manufactured in En. 12 steel, is held between centres on a movable carrier having three positions which are controlled by the operator.

The hardening operation is commenced by loading the shaft in the neutral position midway between the burner and quench units. By moving the shaft into the heating position, the gas and oxygen valves supplying the burners are automatically



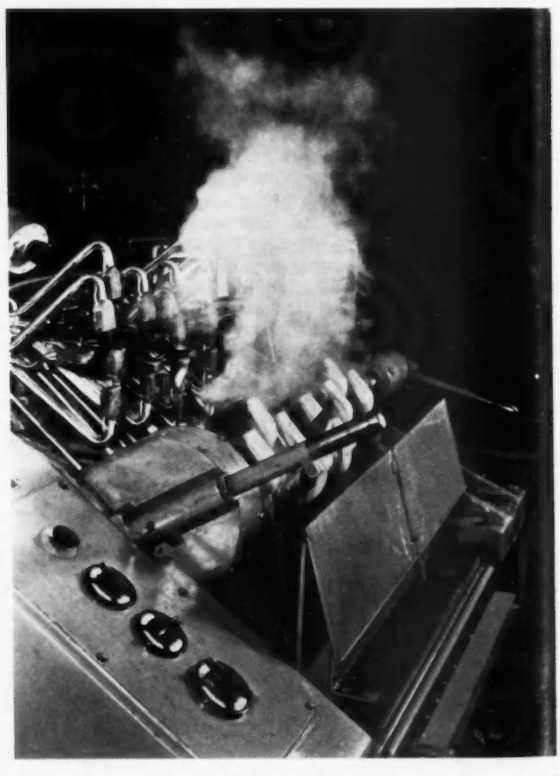
The burners rapidly heating the surface of the pins and journals of the crankshaft prior to the quenching process. The quenching period is set on a time switch so that a certain amount of back tempering may take place, and to ensure thorough drying.

opened, and the burners ignited from a small pilot jet. This movement also starts the motor used to rotate the crankshaft at approximately 45 r.p.m. The machine is equipped with two master crankshafts of the type to be hardened and to these are attached the burners and quenches, which therefore follow in correct relation the movement of the pins as they rotate. This ingenious arrangement allows the two pins and three journals of the two-cylinder crankshaft to be hardened at once, thus saving considerable time. Crankshafts for more than two cylinders have the bearings hardened in groups.

Once the shaft is in the heating position, the Milliscope automatic temperature control comes into service and indicates to the operator the correct moment to move the shaft into the quenching position. The Milliscope—a kind of magic eye—comprises a working head which 'watches' the job being heated and an indicator panel on which two dials are fitted. The temperature at which the component should be hardened is manually set on the left-hand dial and the needle of the right-hand dial starts moving towards the zero point 25° before the pre-set temperature (in this instance 810°C.) is attained, thus giving a visual warning to the operator that the amount of quenching is approaching. That the temperature is reached but not exceeded is most important because when attained it gives the correct depth of hardening, and to exceed it might seriously affect the properties of the finished job. When the needle reaches the zero point the operating lever is pulled to bring the shaft into the quenching jets, this movement automatically opening the water valve. At the same instant a variable time switch is set in operation and this subsequently closes the water valve allowing some heat to remain in the material to give a pre-determined back tempering effect and complete drying. The motor for rotating is then automatically switched off as the shaft is brought into the neutral position for removal.

The heating operation takes 100 seconds and the quenching a further 45 seconds, thus the entire operation for the two-cylinder shaft takes just over two minutes. The Milliscope completely eliminates the human element in estimating the temperature, thereby enabling consistent results to be obtained indefinitely. The depth of hardening may be controlled by adjusting the burners to vary the length of time taken for the bearings to attain the pre-set temperature.

This latest application of gas at the works of Ruston & Hornsby, Ltd., serves to emphasize the very valuable 'two-



The crankshaft in the quenching unit. The quenches are timed (45 seconds in this case) by an automatic device. After this operation the crankshaft is moved into the midway or neutral position where it is removed.

way traffic' between the Company and the gas industry. Ruston & Hornsby are among the East Midlands Gas Board's largest industrial consumers and employ gas for a great variety of heat treatment and other purposes. They have their own gas-fired bakery, and use gas for cooking and heating in the canteens, central heating, tea making, and hot water supply. On the other side of the account, they are suppliers of an almost infinite variety of gasworks equipment—prime movers, shunting engines, compressor parts, to mention only a few of the most obvious—and the mutual regard between supplier and consumer testifies both to the quality and reliability of Ruston and Hornsby products and to the fuel they employ in producing them.

The Press visitors were welcomed at the works by Mr. V. E. Prehn, Assistant Managing Director, and before inspecting the

new plant they saw an excellent colour film of the process. They were joined by Mr. G. Fitzgerald, Publicity Manager of Ruston & Hornsby, Ltd., Mr. Sydney Smith and Mr. E. H. Harman, Chairman and Deputy Chairman of the East Midlands Gas Board, Mr. H. R. Hart, Commercial Manager, Mr. Bernard Clarke, Divisional General Manager, Mr. G. Davies, Sales and Service Manager of the Gas Board. After tea Mr. Sydney Smith, speaking on behalf of the Gas Board, welcomed the visitors and expressed appreciation of the facilities afforded by Ruston & Hornsby for seeing the new process. Mr. Prehn responded and said it had been a pleasure to entertain them.

Although crankshafts are among the most important components which are now being flame hardened by the oxy-town gas process, they are only part of a very large range of such components which are being satisfactorily and accurately surface hardened in this way. Plants already in use in this country include machines for hardening cam shafts, starter rings, lathe beds, cast-iron chuck bodies, worm drives for coal crushers, a wide range of components in the machine tool industry, and shafts and heavy duty gears for excavators and mining.

One particular plant which has been giving excellent results is a spinning hardening machine for the treatment of carbon and alloy steel gears, having teeth of 6 D.P. and smaller. The gear is rotated between burners until the required temperature is reached, whereupon it is submerged into the appropriate quenching medium. In order that each gear shall be hardened to the same depth and at the identical temperature, a Milliscope automatic temperature control is used to 'watch' the gear during heating. At the pre-set temperature, contacts are closed and by means of relays the gear is automatically lowered into the quench, the burners being simultaneously extinguished.

This type of machine is suitable for treating all types of spur, helical, and bevel gears having fairly small teeth, from, say, pinions and cluster gears up to starter rings of 26 in. diameter.

The running costs of this plant are remarkably low. In a full day's working the gas consumption averages 500 cu.ft. (2½ therms), and 330 cu.ft. of oxygen. More important still is the fact that the gears are consistently hardened to the required depth and pattern of case. Actual floor-to-floor times have been carefully studied and show that it takes 80 minutes to harden a spur gear of 33 in. diameter having 99 teeth 3½ in. in width. The automatic flame-hardening of gears by oxy-town gas is very economical. A thorough test after hardening shows that there is no distortion. The use of town gas is responsible for the lower running costs, quite apart from its convenience and constant supply.

Another plant is specially designed to harden all the wearing surfaces of cast-iron lathe beds. The machine incorporates all the latest refinements, including Milliscope automatic temperature control, speedometer, flow meters, and pressure gauges for gas and oxygen, and can treat lathe beds up to 15 ft. in length. Everything has been included to eliminate the human element and make the whole operation automatic. Several types of burners are employed—some have narrow slots and others are drilled with a number of small holes. In order to pass sufficient gas through these burners the gas is supplied at 4.2 lb. per sq. in. by means of a small compressor.

GAS SALES AND SERVICE CONFERENCE

THE fourth annual Gas Sales and Service Conference organized by the Gas Council will be held at the 'Heads of Ayr' Holiday Camp, Ayr, from September 12 to 14. Following is a summary of the final draft programme.

MONDAY, 10 a.m.

Address by Commander Geoffrey Hughes-Onslow, D.S.O., R.N. (Lord Lieutenant, Ayrshire). Welcome by Colonel Sir Douglas MacInnes Shaw, D.S.O., D.L., J.P. (County Convener, Ayrshire) and Alderman Wm. N. Anderson, J.P. (Provost of Ayr). Address by Sir Harold Smith (Chairman, Gas Council).

'Gas is News.' Chairman: Lieut.-Col. Sir Thomas Moore, C.B.E. (Member of Parliament, Ayr). Reginald S. Hinder (Press and Information Officer, Gas Council) will introduce a panel of speakers; 'National Newspapers,' Frank Owen, O.B.E. (Former Editor, *Daily Mail* and London *Evening Standard*); 'Local Weekly Newspapers,' Mr. J. Ferguson Macnair (Editor, *Ayrshire Post*); 'Women's Press,' Mrs. Jane Evans (Home Editor, *Housewife Magazine*); 'Trade and Technical Press,' Alastair McLeod (Editorial Director—Technical—Industrial Newspapers, Ltd.); 'Broadcasting Services,' George Runcie (Television Organiser, B.B.C. Scottish Region).

MONDAY, 2 p.m.

'Selling.' 'Market Research and Selling,' Mr. Stirling Everard, M.B.E. (Manager, Market Research Station, North Thames Gas Board); 'How Lampson Paragon Approach Selling,' E. J. Rainey (Director, Lampson Paragon, Ltd.); 'Selling—the Manufacturers' Place,' A. C. Hazel (Managing Director, Hurseal, Ltd.); 'Comment on Advertising,' C. F. Tomkinson (Director, London Press Exchange, Ltd.).

'Shops or Showrooms?' 'Retail Selling,' R. G. Magnus-Hannaford; 'Salesmanship in the Showrooms,' Roy H. Lancaster (Sales Manager, Vactric, Ltd.).

'Service to the Consumer.' 'Some Problems of Consumer Service,' W. J. Parsons (Divisional Sales and Service Officer, West Midlands Gas Board, Birmingham Division); 'Mr. Therm Must Think Again,' S. J. Dodd (Supplements and Features Editor, *Birmingham Post*); 'Service by the Appliance Makers,' Dr. H. Hollings, O.B.E. (Director, Cannons (G.A.), Ltd.).

MONDAY, 2.15 p.m.

First Industrial Session.—'The Development of the Team Valley Trading Estate,' W. A. Lloyd-Dodd (Industrial Manager, Northern Gas Board, Tyneside Division); 'Industrial Gas in Gloucestershire,' R. K. Porter (Industrial Engineer, South Western Gas Board, Cheltenham Division); 'Immersion and Radiant Tube Heating,' R. H. Anderson (Industrial Development Engineer, North Eastern Gas Board) and C. G. Broome (Industrial Engineer, North Eastern Gas Board, Wakefield Group).

TUESDAY, 9.45 a.m.

'Shadow and Substance.' 'Shadow—' 'The Importance of Films in the Gas Industry,' R. J. Gregg (Publicity Manager, Gas Council), who will introduce the Gas Council's new sales training film, 'It's Up to You.' '—Substance.' R. J. Gregg will introduce a special feature.

TUESDAY, 9.30 a.m.

'Industrial Gas Sales.' 'An Industrial Selling Plan at Work,' A. E. Tyrrell (Chief Industrial Representative, North Thames Gas Board, H.Q. Division); 'Building an Industrial Sales Staff,' Wm. Johnson (Industrial Service Officer, South Eastern Gas Board)' 'Organization for Industrial Gas Sales in the North West,' W. L. Howe (Industrial Engineer, North Western Gas Board, Liverpool Group and Industrial Gas Centre); 'Assessment of the Non-Domestic Gas Demand of Four New Towns,' G. E. Thomas (Divisional Industrial Gas Engineer, Eastern Gas Board, Watford Division).

TUESDAY, 2.10 p.m.

'The Development of Markets for Gas,' Henry F. H. Jones, M.B.E. (Deputy-Chairman, Gas Council). Contributions by T. B. Linley Howlett (Commercial Assistant, North Thames Gas Board, Western Division), J. E. Funk (Group Sales and Service Officer, North Western Gas Board, Fylde Group), Alex. Bujnowski (Sales and Service Superintendent, Scottish Gas Board, Glasgow District), and H. S. Hughes (Technical Coke Development Officer, Scottish Gas Board).

TUESDAY, 8 p.m.

Civic Reception in the Camp Ballroom.

WEDNESDAY, 9.50 a.m.

Home Service Session. 'Post Entry Training of Home Service Advisers,' R. N. Le Fevre, M.B.E. (Training and Education Officer, North Thames Gas Board); 'Up-to-date Methods of Fruit and Vegetable Preservation,' Miss B. Crang (Head of the Domestic Food Preservation Section, University of Bristol, Department of Agriculture and Horticulture).

WEDNESDAY, 1 p.m.

Luncheon to Home Service delegates.

Manchester Section Chairman's Day in Liverpool

Chairman's Day is the outstanding event in the calendar of the Manchester and District Section of the Institution of Gas Engineers. This year's Chairman being Mr. W. S. Hubbard, Production Engineer of the Liverpool Group, North Western Gas Board, opportunity was afforded Institution members and leaders of Liverpool civic and commercial affairs, about 200 persons in all, on July 8, to inspect the major developments taking place at the Garston works. Occupying a site area of 32 acres, the Garston works (with a capacity of 16 mill. cu.ft. per day) is to be extended to give a daily output of over 30 mill. cu.ft. per day by the addition of an I.V.C.O. plant with a nominal output of 14 mill. cu.ft. per day. Work on this project is now in progress and a portion of the coke handling plant, including a screening, grading and overhead storage installation, is now complete.

Work is also proceeding on the first stage of the new retort house. The coke plant, which is now virtually complete, is designed to handle coke from the new I.V.C.O. plant, the existing continuous vertical retort plant and reclaimed coke from the stock pile.

The carbonizing plant by W. J. Jenkins and Co., Ltd., will consist of four independent benches, each comprising 35 chamber ovens of 3.75 tons capacity, arranged in seven settings of five chambers. The design incorporates a recuperator running the full width of each setting and the benches are to be fired by gases from an independent mechanical producer plant situated between the two centre benches. The whole of the carbonizing plant, including the producers and a power generation plant, will be housed in a reinforced concrete structure with many interesting and unusual features. The architectural design of the building has been given much careful thought and the proposals have been accepted by the Royal Fine Arts Commission. When complete the building will constitute an excellent example of modern industrial architecture and construction. The new coke handling plant will be ready to go into operation in September.

The North Western Gas Board generously entertained members of the Section and guests, to luncheon at the Adelphi Hotel, Liverpool. They were welcomed by the Board's Chairman, Mr. D. P. Welman, and included Mr. W. K. Hutchison (President of the Institution), Mr. G. E. Currier (Deputy Chairman, North Eastern Gas Board), Mr. C. H. Leach (General Manager, Liverpool Group), Colonel W. M. Carr, Sir Eric Carpenter, Sir Alan C. Tod, Sir Frederick West, Lieut.-Col. Buckley, Mr. Owen Francis (Gas Division, Ministry of Fuel and Power), Professor A. L. Roberts, Mr. A. Allen (Divisional General Manager, Warwickshire Division, West Midlands Gas Board, and Chairman of the Midland Section), Mr. R. L. Greaves (General Manager, South Lancashire Group), and the Lord Mayor of Liverpool (Alderman R. R. Bailey). Mr. W. S. Hubbard presided.

MR. W. K. HUTCHISON, in proposing the toast of the Manchester and District Section, said it was characterised by a progressive outlook and had carried out that duty which the senior body must always treat seriously, the encouragement and education of those beginning their careers in the industry and those whose careers did not necessarily take them to the highest positions of responsibility. In the Manchester Junior Association he was impressed by the obvious enthusiasm and good fellowship that existed.

Two Past Presidents

There were present two past presidents of the Institution who had been presidents of the Manchester Section—Sir Frederick West, and Mr. G. E. Currier—and the occasion could not pass without a tribute to their work on behalf of the Institution.

The former Liverpool Gas Company had made an outstanding contribution in the past to the progress of the industry, said Mr. Hutchison. Under an enlightened board of directors they passed through a revolution which was engineered by Mr. C. H. Leach, whose paper on 'Functionalism as a Tool of Management' created a ripple in the pool of industry affairs which could better be described as 'a supersonic bang.' Mr. Leach described a form of management and expressed aims which some of them thought, and most of them saw today, must inevitably form part of the machinery necessary for the functioning of the gas industry of the future. When the dust of battle had died down it became obvious that nothing was more clearly defined than the true and unique importance of the engineer in managing his own affairs. The encouragement given to that aspect was nowhere more clearly demonstrated than in the concluding remarks of Mr. Hubbard in his Chairman's address.

He emphasized that more than anything the engineer as manager of his works was a person charged with the most important of all duties, that of direct human relationship with the men to whom he had to give orders. Not for him the remoteness of high intellectual society or the elite among management, but the daily question of what was the right thing to do.

'One quality should be added—a scientific approach to those problems which meet us every day,' said Mr. Hutchison. 'By this I do not mean that kind of science which moves by slowly, slowly creeping on from point to point, but the attitude of mind in which every problem is a challenge and every fractional point of efficiency gained is a point of triumph.'

MR. W. S. HUBBARD, in reply, said it was to the Institution that all looked for a lead in matters of the greatest concern to the industry, not the least—and in the last analysis the most important of these—being the training and education of the younger men and the maintenance at all times of the highest possible standards. One of his most exacting and rewarding tasks had been to serve as a member of the Education Committee of the Institution and as a member of the Board of Examiners. The building up and maintenance of a high standard of professional knowledge and skill among those employed in the gas industry must for the health of the industry be matched by adequate opportunities, particularly for young men, for advancement to increasingly reponsible positions. This was a problem about which all were concerned and which would require careful, yet adventurous thought.

'With the advent of nationalisation the gas industry entered on a new phase. The least discerning would have perceived the trend towards large administrative and operational units, and while this trend would undoubtedly bring many benefits it was not without its dangers. They must, above all things, strive to maintain the personal touch—that intangible and perhaps ill-defined quality which was yet one of the most important factors in the promotion and maintenance of high morale. Unless an organization was imbued with a right and proper spirit, the fullest benefits could not be expected from development in administrative scientific and operational technique.

'If our industry is to progress—and granted always the good human relations—we must be ready to change our methods and our mental approach to the challenge of the times. Let us by all means remember the lessons of the past and give due credit to the efforts of our predecessors; let us develop and maintain an enquiring and adventurous spirit; let us forget sectional interests and outworn formulæ and seize the opportunity presented to us by the circumstances of today.'

Mr. Hubbard cordially welcomed the Lord Mayor of Liverpool and principal corporation officers with whose staffs the gas industry had maintained cordial relations over many years. He was especially pleased to see that the former Chairman and Deputy Chairman of the old Liverpool Gas Company, Lieut.-Col. A. Buckley and Sir Alan Tod, had been able to attend, and to show they still had the interest of the industry at heart. They showed how to have a commercial mind and yet not forget the Company was a public utility. Others who received a special mention were Sir Frederick West (a past President of the

nstitution), Mr. George Currier and Mr. A. Allen (Chairman of the Midland Section), Messrs. R. Pollard, W. Morland Fox, R. W. Crowther and H. Fishburne (Directors of W. J. Jenkins and Co., Ltd., who are dealing with the major portion of the Garston contract) and Mr. R. H. Quinton, of J. L. Kier and Co., Ltd., who under most difficult labour conditions, had completed the coke bunker installation. Mr. Hubbard paid tribute to Mr. C. H. Leach (Liverpool Group, General Manager), Mr. A. G. Hartley (Station Engineer, Garston) and to colleagues on the arrangements that had been made for Chairman's Day.

MR. D. P. WELMAN (Chairman, North Western Gas Board) proposed the toast of the 'City and Port of Liverpool and Guests.' He reviewed the history and development of the city and remarked that between 1800 and 1938 the tonnage of ships entering the port increased from 500,000 to nearly 18 mill. Today, Liverpool as a port was second only to London and handled about one-third of the national imports and exports.

On the gas industry, Mr. Welman said Liverpool shared with Preston the distinction of having established in 1815 the first gas company outside London. Which precisely was the first of these two had never been satisfactorily established, but this was a dispute which could be regarded as happily resolved now that both Liverpool and Preston each formed part of the North Western Gas Board.

The LORD MAYOR of LIVERPOOL, in reply, recalled that Liverpool was a pioneer in the use of gas for cooking and lighting. Hargreaves had taken up the challenge 'Let there be light and there was light,' and provided the light for dark streets. Sometimes he felt that same spirit had evolved gas for cooking, which was, he said, of such great service today.

Following the visit, MR. J. M. MCLUSKY (Senior Vice-Chairman), proposed the vote of thanks for what he called a 'most successful Chairman's Day which has upheld the glamour and the traditions of similar occasions in the past.' He said the members and guests appreciated the facilities to see the interesting work in progress at Garston. Without the goodwill and co-operation of the area boards little could be accomplished.

MR. R. L. GREAVES (Junior Vice-Chairman) seconded and MR. C. H. LEACH (General Manager, Liverpool Group) briefly replied.

GAS PRICES UP IN FOUR AREAS

The biggest increase in the price of gas ever made in Scotland was announced by Sir Andrew Clow, Chairman of the Scottish Gas Board, at a Press conference in Edinburgh on July 13. The price of gas is to be raised by an average of 11%—2½d. a therm more on the first block of consumption (up to 27 therms a quarter), 2d. a therm on the second block (the next 600 therms), and 1½d. a therm on the remaining three blocks which concern mainly industrial consumers. Concessions given for steady, seasonal, or daily consumption will continue and will be extended in cases which justify extension. The Board attributes the new increases to dearer coal and transport, higher wages, and increased charges for capital development.

Sir Andrew said the recent increase in the price of coal had most serious results for the gas industry. It was estimated that owing to the present alteration in coal prices the Scottish Gas Board would have to pay for coal in a full year an additional sum of about £1,550,000. Not all of this had to be paid this year, but as any alteration in gas prices would operate for a shorter period of this year than the increase in coal prices, the change was likely to have an even more adverse effect in the financial position this year than in a full year.

In addition, the Board had to meet a little more than last year of the previous increase in coal prices, so that in a full year it would have to pay the Coal Board or its agents about £1,600,000 more than last year. Expenditure on securing coal went up further because it had to import an increased amount of English coal with its high transport charges. After allowing for this, the Gas Board estimated that it would have to pay an additional £1,800,000 per year. The increase of gas prices would yield about £1,650,000 and, with increased efficiency, it was hoped this would suffice to cover the demands for coal.

There were further serious items of expenditure which the Gas Board had to meet. The biggest was in the wages of employees. The increase given in these and in salaries at the beginning of April were estimated as costing £340,000; to this had to be added about £60,000 for the full operation of increases given partially last year. Other large increases were in the charges for depreciation and interest due to capital development; these were likely to amount to £370,000, of which £90,000 was due to the raising of the bank rate to 4½%. Most of this was for the replacement of obsolete plant and materials. The modernization of works and the elimination of small works has effected some reduction in labour needs and a higher efficiency of gas manufacture; but much capital expenditure, particularly that on new housing schemes, could not be fully remunerative for some years.

Among other increases falling on the Board would be an additional £85,000 for rail transport, and there would be increases due to the general rise in the cost of materials. These charges involved a probable addition to expenditure this year of about £900,000, and there would be nothing left of the present increase in gas income after the extra cost of coal had been met. Indeed, they hoped to be able to meet the other charges by increases in the prices of by-products, particularly coke, and by steady improvement in working conditions.

Threepence Increase in the North

The price of gas is to go up by 3d. a therm in the Northern Gas Board's area. The Northern Gas Consultative Council at its meeting in Newcastle on Monday approved this recommended increase after Mr. E. Crowther, Chairman of the Board, had told the meeting that the increase was due mainly to the increase in the price of coal.

Mr. Crowther's statement pointed out that the Board's accounts for the year ended March 31, 1955, would show an almost exact balance between income and expenditure. When the price of gas was raised about a year ago to help to meet increasing costs it was stated that unless sales could be expanded the gas price increase with improved working efficiency would not fully cover extra expenses and a deficiency of about £100,000 would result. Sales had, in fact, expanded and the estimated gap had just been closed although nothing was available to be added to the Board's reserves.

Since the close of the financial year a sharp deterioration had occurred and the Board had been running at a considerable loss. Besides this loss, the Board had now to reckon with the coal price increases just announced. Mr. Crowther said that increased costs which the Board would have to meet were estimated as follows in a full year: Coal and coke oven gas, £1,130,000; rail charges, £25,000; wages, salaries, superannuation and national insurance, £295,000; interest and other capital charges, £230,000, making a total of £1,680,000. It was estimated that after making allowance for net improvements in by-product revenue the Board's extra costs would be between £1,400,000 and £1,450,000 in a full year.

Mr. Crowther told the Council: 'The Board cannot hope to meet any significant part of this amount from forseeable internal resources, consequently a further increase in the price of gas is inevitable and urgent. It is, therefore, the Board's intention to increase the generality of its published prices by 3d. per therm, retaining the present tariff structure whereby the increase becomes 2d. per therm for gas used in excess of 30 therms per quarter and so on.'

Mr. Crowther said that as a result of this increase the annual additional revenue was estimated at £1,300,000. 'The Board will endeavour to meet the remainder of its extra costs by still further improving its efficiency but it cannot be overlooked that the increase in coal prices is likely to increase the cost of other goods and services bought by

the Board and no account has been taken of this in calculating the extra direct costs to be met by the Board.'

Commenting on the increase, Alderman Joseph Hoy, Chairman of the Consultative Council, said that the price of gas would have been increased in any case because of increases in wages and development and capital charges. Nevertheless, the 3d. increase proposed was very largely made up of extra coal costs, he added.

The Council decided to protest to the Chancellor of the Exchequer on the effect of the raising of the Bank rate on essential industries. The Chancellor will be asked to make some discrimination between these and the luxury trades.

Mr. Welman Was Ready

Mr. D. P. Welman, Chairman of the North Western Gas Board, told the North Western Gas Consultative Council, at Manchester on July 7, that it was proposed to raise gas prices on the following basis: For an increase in the price of coal of 6s. to 8s. 6d. per ton, an increase of 1½d. per therm in the price of gas; coal increase 9s. to 13s. per ton, gas price increase 1¾d. per therm. (The coal price increases announced next day by the National Coal Board show an average increase of 12s. 5d. per ton for gasworks coal.)

Mr. Welman said the Board had always been prepared in forward estimating to anticipate the continued recovery of at least some part of increased costs that were beyond their control, and such increases had been considerable since March 31, 1955. In view of increased coal costs it was no longer possible to take what might be called excessive commercial risks.

The price of coke would be raised to somewhere near its proper value as a fuel, but the Board would still sell coke cheaper than other areas. Mr. Welman went on to say that although it might seem fair in a monopolistic industry to charge for coal on the basis of its calorific value as a fuel, what he objected to was the price including a lot of 'other items.' He had never been able to find out what these items were. He felt the gas industry was being penalized. As long as coal was in short supply and controlled in price there would always be difficulties. If coal could be bought in the open market and left to find its own price level then prices would get properly in line with commercial commonsense and with consumers' wishes. With freedom from coal control, he suggested, they would shortly find we were not so short of coal as we thought, and that in a few years we would not be short of coal at all.

Concerning the changeover to smokeless combustion, which had to be viewed as a long term matter, he considered that at present coke was underpriced for its heat value if properly used. He hoped to be able in a short time to give information about a new development in solid smokeless fuel.

South East: 2d. More

As the temperature topped 80 degrees in London, the South Eastern Gas Consultative Council listened at Westminster to Mr. W. K. Hutchison, C.B.E., Chairman of the Board, announce an increase in the price of gas. As he, the Council, Press and public, mopped their brows in the humid Westminster chamber, he summarized the proposals as follows:

1. An increase of 2d. per therm on the flat rate price.
2. The introduction of an optional two-part domestic tariff available to all domestic consumers, with a standing charge of 26s. a quarter and gas at 25% off the flat rate prices.
3. The standardization of the prepayment supplement at 2d. a therm.

The new prices to come into force from the first reading of meters on or after August 8.

Towards the end of the special meeting, a member of the Consultative Council, who stated that he contributed to the work of the National Assistance Board, said: 'This is going to have a serious effect upon the National Assistance Board, too. I don't know what the old age pensioners are going to do—I don't know. . . .'

Referring to the increase in the price of coal as 'crippling blows that handicap us still further in our fight to stabilize the price of gas, Mr. Hutchison continued: 'Up to the end of December, 1954, we were hoping that the prices fixed for gas last August could be maintained throughout the present year. Indeed, as a result of keeping down the cost of gas manufacture and selling more gas and appliances than ever before, we were able to cover our expenses for the financial year ended March 31, 1955, with a small margin.

'But already by then costs had begun to move against us. There had been substantial increases in wages and salaries. Higher interest rates had to be paid on borrowed money. To add to this, costs of pensions and national insurance have gone up and the prices of some materials and services are higher. There was also an increase in coal freights, though this will be offset by an increased recovery from coke. As a result of the hire purchase restrictions now in force we cannot hope to repeat last year's record appliance sales. To cover the factors so far mentioned, and to provide some small surplus, we would have to raise about £1,300,000 extra revenue.'

Mr. Hutchison then came to the coal price increase. The average rise on the price of the coal which the Board require for gas-making was about 12s. 9d. per ton, he said. The extra cost would be £2½ mill. in a full year. It would mean that over the last five years, the average price payable by the Board for the coal would have gone up by over 70%.

Said Mr. Hutchison: 'We are therefore forced to put up the price of gas and we propose to increase the flat rate prices by 2d. per therm.' This, he submitted, would be an extra charge of 5d. per week for the 'average consumer'.

In view of the huge increase in the cost of coal, said Mr. Hutchison, the Council might be surprised that it was proposed to keep the increase in the price of gas as low as 2d. per therm. The explanation was that they should have to ask for a substantial increase in the price of coke.

Mr. Hutchison then came to what he called 'constructive proposals'—concerning a new domestic two-part tariff and pre-payment supplements. The optional two-part tariff should, he maintained, encourage people to make fuller use of gas in their homes. There would be a standing charge of 26s. a quarter, the same for everyone, and gas would be supplied at 25% less than the flat rate price. He illustrated the effect by giving the new flat rate gas prices which would apply in the area and the reduced prices at which gas supplied under this tariff would be charged.

Inner London: 22d. per therm, flat rate, 16.5d. per therm, under two-part tariff; outer London and most of Kent and Sussex, 23d., flat rate, 17.25d., tariff; remainder of Kent and Sussex, 24d., flat rate, 18d., tariff.

The new tariff would be available on application to credit and pre-payment consumers throughout the area, and the terms would be the same for both. No meter rent would be charged.

The two-part tariff in force in the Metropolitan Divisions would now be varied to make them exactly the same as the two-part tariff which is now being offered to domestic consumers in the rest of the area.

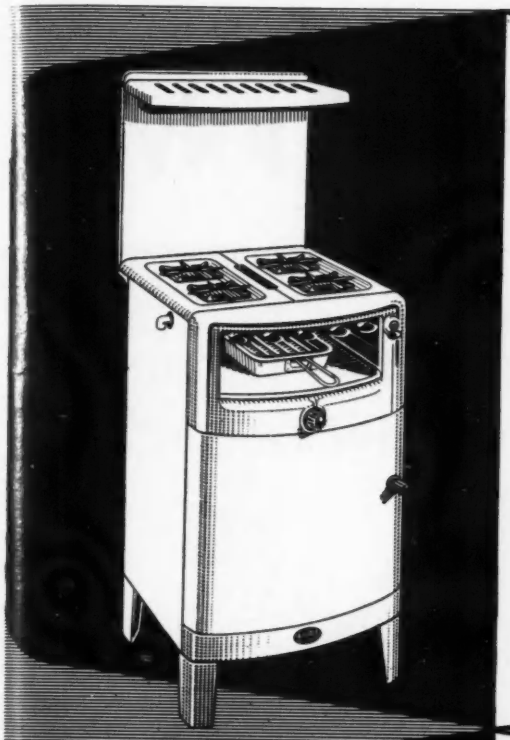
Tariffs already introduced for non-domestic consumers would continue unchanged, except that the new flat rates became the starting point of each tariff. The baking tariff, which was 100 therms at the flat rate and 14d. per therm thereafter would be altered to make the commodity price 15.5d. per therm.

Turning to pre-payment supplements, Mr. Hutchison said that for many years before vesting date gas undertakings had a series of supplementary charges calculated according to the quantity of gas consumed, so that consumers who took gas through slot meters could pay an inclusive price which would cover meter rent, and, in some cases, the supply of appliances and fittings, as well as the charge for gas itself. There were still surviving over 100 different supplements varying from 1d. to over 5d. a therm.

Continued Mr. Hutchison: 'We propose to simplify all this by introducing a new standard supplement of 2d. per therm for which the Board would provide standard services which include the meter, the initial fixing of a cooker and the inspection of approved appliances.

'This new supplement, with its standard services, will replace all present supplements and service arrangements, and moreover will be limited to a maximum of 6d. per week.

'The new supplement does not cover the supply of a cooker; cookers or other appliances which have already been supplied under the terms of existing supplements will be left with the consumers who have them, but the Board will not in future undertake to repair or replace such appliances free of charge.'



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Illustrated leaflet available on request.

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TRADE NEWS

The 'Domobile' excavator

A party of technical Pressmen was recently invited to see the 'Domobile' excavator—a Swedish importation—in action at Ulting, Maldon, Essex, recently.

The 'Domobile' was first demonstrated to the party in a film at the works of Ernest Doe & Sons, Ltd., the British representatives. It may be used with a backacter (drag shovel), face shovel, grab or crane and each of these are claimed to be interchangeable in 1½ hours. Otherwise known as the ABS Universal Model U25, its maximum length, excluding boom, is over 15 ft.

When supplied in this country it is powered by the Ford industrial diesel pack engine, series 563E, and is coupled to a standard Ford truck box giving a wide range of travelling and working gears. Its total weight is 6¼ tons. Wrap-round half-tracks are available giving traction over difficult terrain. The road speed is 25 m.p.h. Stability is ensured by the hydraulically operated support. This heavily constructed member takes the whole strain of work off the frame of the machine and provides a rigid working platform over the whole width of the excavator.

Only the necessary working parts of the actual excavating machinery place any weight on the king-post. All the weight of the cab, engine and winding drums bears directly on the chassis, cutting down wear on the king-post to the minimum.

As will be seen from the illustrations, the driver's comfort has been well looked after. Hydro-assisted controls are claimed to mean exact positioning without great effort, and the cab is free of engine and fuel fumes, at the same time giving all-round visibility. It is not necessary to move from the cab to drive the machine forward. All controls are situated within easy reach.

The Domobile Universal excavator, notable for the remarkably clear all-round vision from the steel-framed armour-glass cab.

Here are some figures given to the Press: *The face shovel*, with standard boom, stick and dipper, has a capacity of 9 cu.ft. Its digging height is 12 ft., and the dumping height 7 ft. The boom length is 11 ft. *The grab and crane* have a capacity up to five tons. The lightweight tube boom for all clamshell operations can be 20-30 ft. in length. It can be raised to a height of over 12 ft. *The drag shovel* with standard boom, stick and bucket has a capacity of 9 cu.ft. Its deep digging reach is 12 ft. and its digging radius is 20 ft. The boom length is 11 ft. *The dragline*, with dragline bucket, has a lightweight tube boom 20-30 ft. long. Its deep digging reach is over 13 ft., its digging radius 24 ft., and the dumping height over 16 ft.

Driven in a convoy of staff cars to a site where the 'Domobile' was in action on a project, the Press were given a highly impressive display of trench-digging with the drag shovel. No timings were taken, but in a short demonstration an 11 ft. trench was extended and widened, showing great flexibility in handling.—*Ernest Doe and Sons, Ltd., Industrial Division, Ulting, Maldon.*

The cab, motor, drums, etc., of the Domobile Universal excavator are mounted direct on the chassis, relieving the turntable of much dead-weight and reducing wear on the bearings. The boom is fitted with a counterweight which can be seen protruding at the side in this picture.

Re-designed Holmes-Western valve

In 1899, the manufacturing rights of the Holmes patent rotary scrubber washer were exchanged with the Western Gas Construction Co. of America for the patent rights of the Western gas valve, now known as the Holmes-Western valve. The success of this early Anglo-American co-operation has been proved by the demand for the Western valve by the gas industry during the past half century.

Recent investigation has been directed towards the improvement of constructional details. As a result, valuable new features have been evolved and they are incorporated in a new design. The re-designed Western valve embodies all the advantages that new materials and modern production methods can give.

The valve is of the full bore, double faced parallel slide type, with discs between which is an assembly of two levers arranged to engaged with a wedge in the base of the body when the valve is closed. To comply with the safety recommendations issued by the Institution of Gas Engineers for the safe opening of gasworks plant the vent plugs are of adequate size to ensure free discharge to atmosphere of any gas which may pass the faces. More positive methods of ensuring effective isolation are advised by the Gasworks Safety Rules Committee, but this facility offered by the

double faced valve is of value when other methods cannot be employed.

Disc guides cast in the body and fine machined to the level of the body faces, ensure perfect contact of the discs with the seatings throughout the full travel of the valve, effectively improving the self-cleaning action.

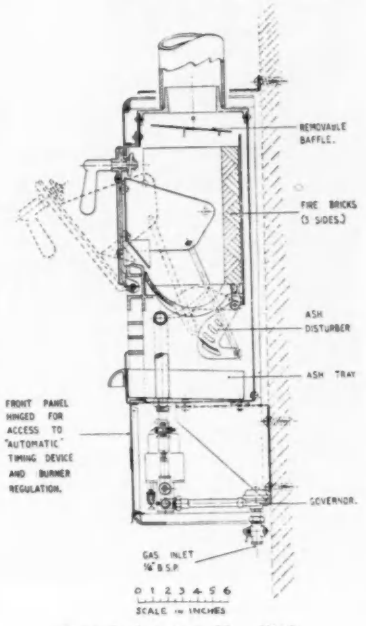
In re-designing the complete range of valves, the opportunity has been taken to standardize and ensure the interchangeability of components. Hence the division of sizes into four groups, each group employing identical parts other than the main items, which are the body, bonnet, discs, yoke, slipper and spindle. Items such as the nut, springs, wedge and idicator assemblies are identical within the group. In addition the various special attachments for manual or mechanized operation have been re-designed, again conforming to similar standards, and for ease of identification all valves are provided with permanent markings indicating the size, type, and year of manufacture.—*W. C. Holmes & Co., Ltd., Turnbridge, Huddersfield.*

Bennis chain grate stoker

Bennis Combustion, Ltd., Little Hulton, Walkden, Manchester, announce the introduction of the latest model in their range of mechanical stokers—the Bennis Mark III chain grate stoker for shell type boilers. Three 'Marks' have been produced since 1949, each introducing improvements dictated by operational experience. This latest model, while retaining the original robust chain grate links on which there is now a three years fair wear and tear guarantee, includes a hopper of streamlined appearance and lighter construction, and which is easier to remove. It also eliminates any possibility of coal stagnation and subsequent firing back. The ignition arch is supported by Carbofrax bricks, and improvements have been made in air distribution within the chassis. Forced draught fans can be erected overhead or at firing floor level according to choice.—*Bennis Combustion, Ltd., Little Hulton, Walkden, Manchester.*

Gas-fired incinerators

A range of gas-fired incinerators is produced by William Sugg & Co., Ltd., Vincent Works, Regency Street, S.W.1, for installation in hospital wards, dental surgeries, factories, and office blocks. These incinerators have been officially approved by the Institute of Public Health and Hygiene and are of importance to medical officers, personnel managers, and others responsible for the hygiene and well-being of large staffs, as their installation meets a vital need in eliminating improper disposal of articles in drains, etc., and also promptly destroys a potential source of disease. Simple to install and economic to run—the average cost would be just over one penny for an hour's continuous burning—they provide a safe and totally efficient means of disposal for dressings and sanitary aids, making them of particular personal benefit to women employees. One of their most useful applications is in the dressing and surgical wards of hospitals and nursing homes for the disposal of soiled dressings, swabs, and bandages. The simple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action or opening the door lights the main burner from a pilot jet. An automatic timing device is fitted, which can cut off the gas after a burning period ranging from three to 120 minutes as required, the usual time, however, being only 10 minutes. The incinerators are finished in either cream or white. They can be obtained direct or through gas boards, architects, and building contractors.—*William Sugg & Co., Ltd, Vincent Works, Regency Street, S.W.1.*

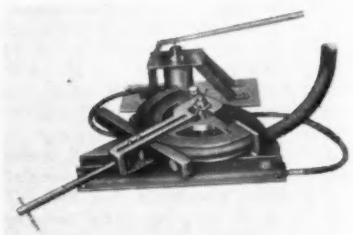
Free piston compressor

Because the piston groups in a Pescara-Muntz free-piston compressor are of equal weight and work horizontally in opposite directions, these engines are perfectly balanced and vibrationless when running. These features, combined with the light weight of the unit, make the Pescara-Muntz compressor ideal for lorry mounting. As a mobile plant it can be mounted on a much lighter chassis than the orthodox type of machines of similar rating. Chassis considered suitable include the Trojan 1 ton, Ford Thames 30 cwt., Morris 1½ tons van, Bedford 20/25 cwt. and Commer 1¼ ton van. The saving in first cost, running cost, taxation and depreciation effected by the use of a mobile plant on these light weight vehicles is considerable. The Pescara-Muntz is an all-British compressor having a rated output of 105 cu.ft. per minute at 100 lb. per sq. in. maximum pressure. Because of the superior efficiency of its free-piston operation and its continuous adjustment of output, it can operate two heavy tools continuously at full efficiency. It is manufactured and distributed by *Mackay Industrial Equipment, Ltd., Feltham.*

The Pescara-Muntz free-piston compressor.

Tube-bending development

The illustration shows a new development in the 'Scols' range of tube bending machines. This model, the 'HR' (Patent No. 681293) enables light gauge non-ferrous tube up to 2 in. outside diameter to be bent quickly and easily, and has a particular advantage inasmuch as light gauge tubing up to and including 1¼ in. diameter can be easily bent by hand without the hydraulic power.



'Scols' Model 'HR' tube bending machine.

The heavy construction of the machine makes this hand bending an easy operation.

When, however, tube of larger diameter than 1¼ in. is desired to be bent, it is possible to use immediately the hydraulic pump without any special adjustment, and to utilize the power thereby obtained for bending this larger size of tubing.

A bend of 180° can be obtained in three operations, during which time, however, it is not necessary to move the position of the tube in the former.

When utilizing this machine for hand operation it is, of course, essential that it should be bolted on to a firm bench. When using with the hydraulic pump attachment the machine can be loose on the floor, or in any position most suitable for the work in hand.

A stand can be supplied if required.—*Major, Robinson & Co., Ltd., 'Scols' Works, Warwick Road South, Manchester, 16.*

Gas dehydration plant

An order has been obtained by Head Wrightson Processes, Ltd., Thornaby-on-Tees, in conjunction with the Fluor Corporation of the United States, for two gas-dehydration plants for the Gas and Fuel Corporation of Australia. The plants will dehydrate 18 mill. cu.ft. of gas daily.

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Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10 in. deep × 7 in. wide; block screen 120.

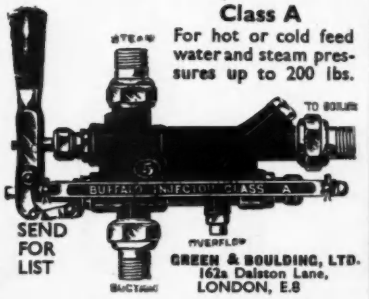
BUSINESS MANAGER: S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30. *Telephone:* Kings Norton 3868
NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.
SOUTHERN REPRESENTATIVE: A. Engelhardt, 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Central 2236-7

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.
Telephone: CENtral 2236-7. *Telegrams:* Gasking, Fleet, London.

OXIDE
DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON
Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide
Send your enquiries to
GAS PURIFICATION & CHEMICAL COMPANY LIMITED
ESTABLISHED 1873
PALMERSTON HOUSE, BISHOPSGATE, LONDON, E.C.2.
Telegrams: "Purification, Stock, London." Telephone: London Wall 7938/9 & 7930

"KLEENOFF" * THE COOKER CLEANER
"KLEENOFF" FIBRE BRUSHES RUBBER MOPS
"KAY-DEE" * KETTLE DESCALER
For resale to the public, and in bulk for works use.
BALE & CHURCH, LTD.
7, CROMPTON WAY, CRAWLEY, SUSSEX

BUFFALO INJECTORS
Class A
For hot or cold feed water and steam pressures up to 200 lbs.


SEND FOR LIST
GREEN & BOULDING, LTD.
162a Dalston Lane, LONDON, E.8

There are viewers . . .

. . . and viewers, of course. The evil eye seen above may be looking for atom plans, ankles, or evidence, but this is not the sort of viewer we had in mind. The stereoscopic viewer, showing 3-D pictures in colour, is the salesman's latest weapon, and its usefulness increases in direct relation to the size of the thing he is selling. You pop in a slide, press the button, and there you are—you are there. But the production of slides is a job for the expert. If you are interested, you would be well advised to contact **Walter King Photographs** at 11, Bolt Court, Fleet Street, E.C.4. (CEN. 2236).

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18–64 inclusive or a woman aged 18–59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

SCOTTISH GAS BOARD

GAS FITTER required. Rate of pay and conditions as laid down by N.J.I.C. The successful candidate may be required to pass a medical examination. A small house may be made available to rent.

Applications, giving details of age, present duties and the names of two referees, should be made to the undersigned within two weeks of the appearance of this advertisement.

G. C. WOOD,
Sub-Group Manager.

Gas Works, Galashiels.

GAS PURIFICATION & CHEMICAL COMPANY LIMITED

APPLICATIONS are invited from suitably qualified persons for the post of CHEMIST.

Candidates must be experienced in the normal gas works routine tests and have good knowledge of dry purification, and the testing of purifying materials. Excellent opportunity for young man of good education and initiative.

Applications, stating age, details of experience with names of two referees, to be addressed to:—

The Secretary,
Gas Purification & Chemical Company, Limited,
Palmerston House,
51, Bishopsgate,
London, E.C.2.

SOUTH WESTERN GAS BOARD

APPLICATIONS are invited for the post of ASSISTANT STATION ENGINEER at Hollacombe Works, Torquay, within the grades APT. 10-12. Initial salary will be dependent upon experience and qualification. There are no additional emoluments.

Applications should be sent to the Chief Engineer, South Western Gas Board, 9a, Quiet Street, Bath, not later than Saturday, July 30, 1955.

SOUTH WESTERN GAS BOARD

BRISTOL/BATH DIVISION
APPOINTMENT OF CHEMIST

APPLICATIONS are invited for the position of WORKS CHEMIST within the Division—initially at the Bath works.

The duties would include deputising for the Senior Chemist. Applicants should be familiar with all Gas Works Chemical Tests and Chemical Control of Plant.

Possession of the Higher National Certificate in Chemistry is desirable, and the Ordinary National Certificate is a minimum qualification.

The salary will be within Grade A.P.T 7 (£620-£700) of the scale of the National Joint Council for Gas Staffs.

Applications should be received by the undersigned not later than Wednesday, August 3, 1955.

CHARLES R. INGHAM,
Production Engineer and Manager.

Radiant House,
Bristol 1.

SCOTTISH GAS BOARD

VACANCY—DAWSHOLM WORKS
CHIEF TECHNICAL ASSISTANT

APPLICATIONS are invited from suitably qualified persons for consideration in respect of the above vacancy.

Applicants should have experience in the operation and control of large scale coal carbonisation, carburetted water gas production, all ancillary processes, and will be required to supervise the carrying out of all routine gasworks tests.

The post is graded within Scale A.P.T. XI (Provincial "A" (£785—£910 per annum) of the National Joint Industrial Council Salary Scales for Gas Staffs, and the successful candidate will require to join the Board's Pension Scheme and may be required to undergo medical examination.

Applications, endorsed TA/Ch., should be in the hands of the undersigned not later than August 6, 1955.

D. F. YOUNG,
Divisional Controller.

9, George Square,
Glasgow, C.2.
July 14, 1955.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
FURNACE DRAUGHTSMAN, SOUTH STAFFORDSHIRE MOND DISTRICT

APPLICATIONS are invited for the above position in the Industrial Department of the South Staffordshire Mond District at Tipton.

Candidates should have had some experience of furnace design and be capable of working on own initiative.

The salary for the post will be within Grade 7 (£620-£700 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to: Mr. A. F. Allen, District Secretary, West Midlands Gas Board, South Staffordshire Mond District, Dudley Port, Tipton, Staffs., to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
VACANCY FOR DRAUGHTSMAN

APPLICATIONS are invited for the pos of Draughtsman in the Divisional Engineer's Department, located at Smethwick.

Candidates should have had experience in the design of light structural steelwork and/or pipework. Possession of the Ordinary National Certificate in Mechanical Engineering would be an advantage.

The salary for the post will be within Grade A.P.T.7 of the National Salary Scales for Gas Staffs.

The appointment is superannuable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, should be addressed to Mr. F. Harvey, Divisional General Manager, West Midlands Gas Board, Walsall and District Division, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him within fifteen days of the appearance of this advertisement

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE-HEREFORDSHIRE DIVISION
RELIEF SHIFT SUPERINTENDENT
REDDITCH GROUP

CANDIDATES should possess practical experience in the operation of modern gas works plant, including continuous vertical retorts and automatic water gas plant.

The salary will be within Grade 6 (£565-£645) of the National Salary Scales for Gas Staffs.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with details of present and previous employment and the names of two referees, should be addressed to Mr. C. F. W. Rendle, Divisional General Manager, West Midlands Gas Board, Worcestershire-Herefordshire Division, Divisional Office, Newtown Road, Worcester, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

COVENTRY TECHNICAL COLLEGE

REQUIRED full time teacher of GAS FITTING and related subjects for September 1955 or later by arrangement. Candidates should have suitable technical qualifications coupled with good practical experience in this class of work. Previous teaching experience advantageous. Salary, Burnham Technical Scale for Grade B Assistants (£525 x 25—£820). Commencing salary dependent upon previous experience. Application forms and further particulars from Director of Education, Council House, Coventry.

PLANT FOR SALE

FOR SALE.—36 Newbridge Type 3A/UNI Gas Controllers rebuilt by makers 15 day run with 2 tappet dials complete with standard pattern gas cocks. 59s. 6d. each or near offer. 36 Mark IX Comet igniters complete. 24s. 3d. each or near offer. Offers to the Borough Surveyor, Town Hall, Wokingham, Berks.

BREEZE BRIQUETTING PLANT

AVAILABLE for immediate disposal, a Robert Cort BREEZE BRIQUETTING Plant complete. Capable of 1, 2 or 3 tons per hour continuous production and comprising a crushing and mixing mill, fluxing "pug," cooling pan, bifurcated loading chutes, steam boiler and driving motor, all mounted on two trailers to form an entirely mobile plant requiring only external electrical power and water supplies.

This plant incorporates the "Tapping" patented renewable surface moulding press unit.

A considerable number of spares appertaining to this plant are also available for disposal.

For full details, price, etc., apply to H. G. Stapley, Area Assistant Engineer (Devon and Cornwall), South Western Gas Board, Hollacombe Works, Paignton.

STRINGER BROTHERS
ALBION WEST BROMWICH

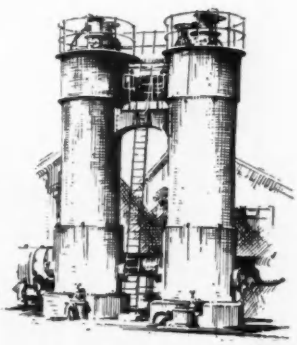
S.B
IRON & STEEL
PLATES & SHEETS
BARS & SECTIONS
Telephone:
WEST BROMWICH 0436-7

On tradition . . .

"It's all a matter of tradition," said the Cat. "What is tradition?" asked Alice rather crossly. "Something that is handed down," the Cat replied. Alice, being a younger sister, understood about things that are handed down. "I don't think I should like a tradition," she said politely. "If it's handed down, it's certain not to fit." "You mustn't let your tradition be too big for you" said the Cat, beginning to vanish. "In that case" said Alice, "I think I'll have a new tradition at least once a year."

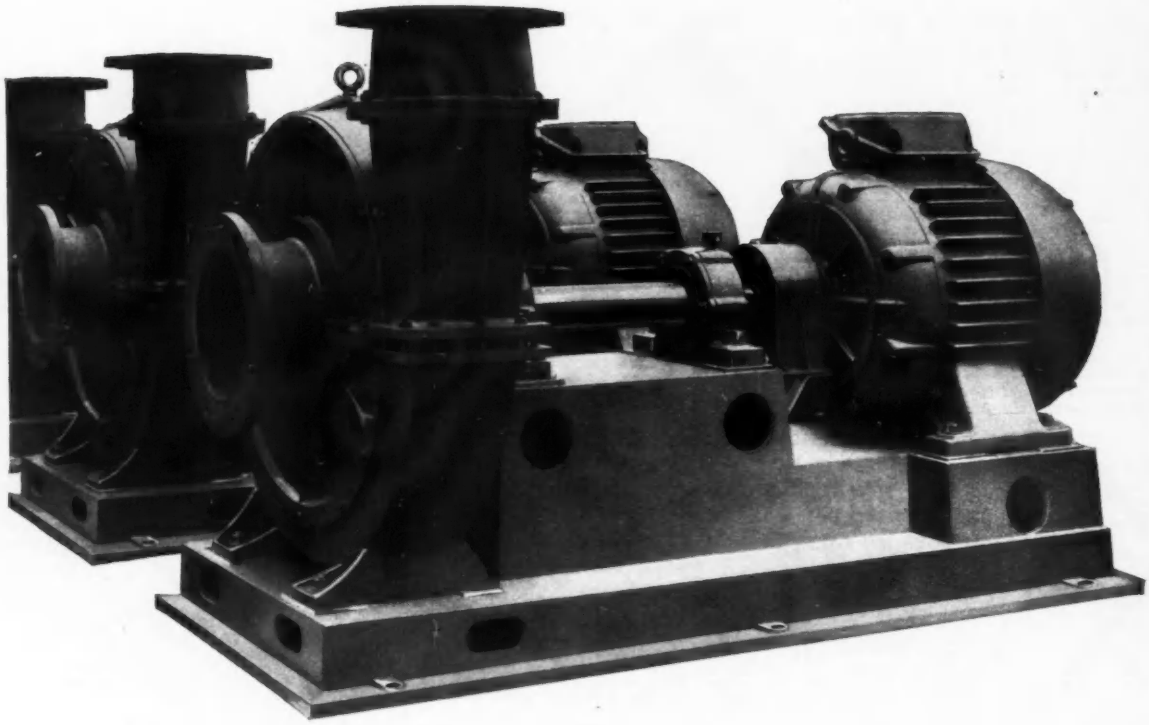
(As Lewis Carroll might have written)

FOUNDED 1850
HOLMES
HUDDERSFIELD



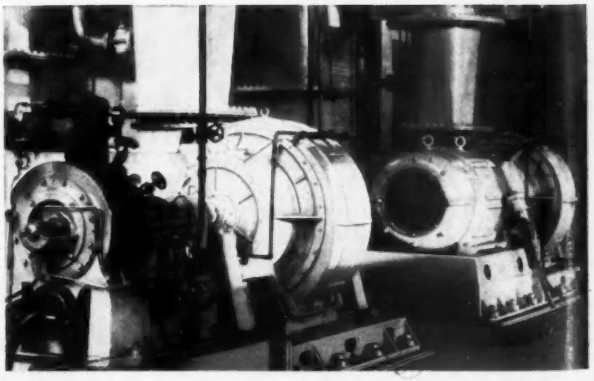
W. C. HOLMES & CO. LTD. · TURNBRIDGE · HUDDERSFIELD

C4683



Gas Boosters?

Photo by courtesy of the S. E. Gas Board and Humphreys & Glasgow Ltd.



EXAMPLES of gas boosting fans with cast iron casings are illustrated here. They represent the results of special attention to the design and development of robust, trouble-free boosters over the years. This experience provides fans for handling volumes of 5,000 to 1½ million cubic feet of gas per hour at pressures up to several pounds per square inch.
When the time comes you'll find there's no easier way to solve your air or gas moving problem than to put it to Keith Blackman.

contact **Keith Blackman Ltd**

MILL MEAD ROAD · LONDON · N17 · TOTtenham 4522

T.A.722 610

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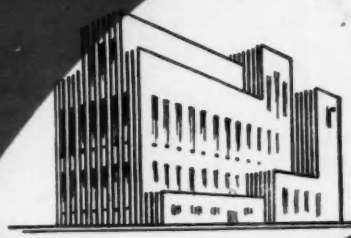
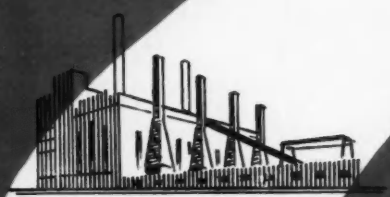
Two sides to the quest



CONTINUOUS

OR INTERMITTENT



. . one answer **WEST'S**

GLOVER-WEST CONTINUOUS VERTICAL RETORTS

C·O·L INTERMITTENT VERTICAL CHAMBERS

WEST'S GAS IMPROVEMENT COMPANY LIMITED

Albion Ironworks, Miles Platting, Manchester 10. Telephone: COLlyhurst 2961

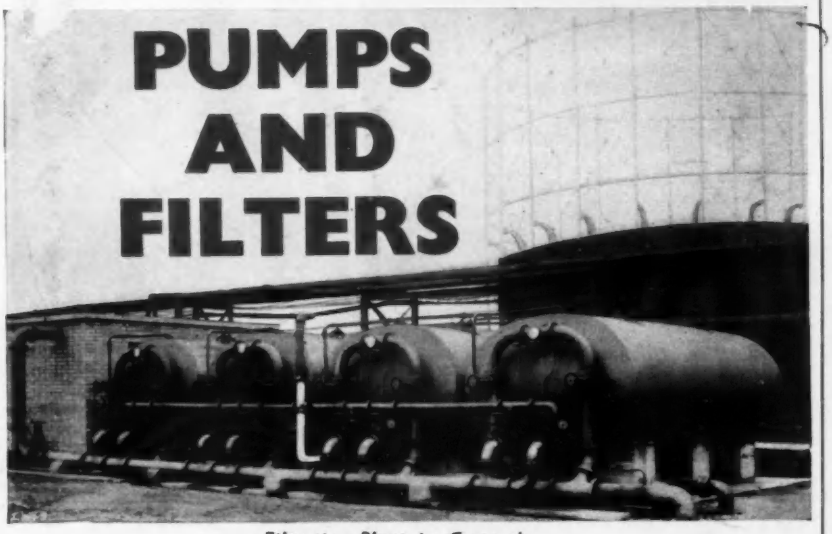
London: Columbia House, Aldwych, W.C.2. C.O.L. Division: Chandos House, Buckingham Gate, S.W.1.

GCP

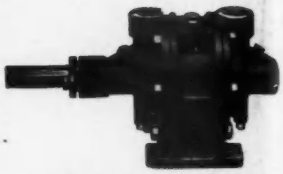
IN ASSOCIATION WITH Joseph Evans

...ONWORKS • CULWELL WORKS
...EADING WOLVERHAMPTON

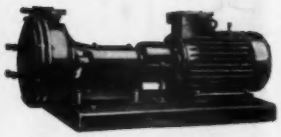
PUMPS AND FILTERS



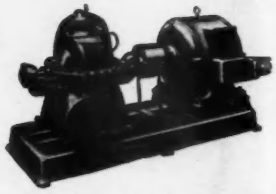
Filtration Plant in Gasworks



Rotary pump for Oil transfer duties

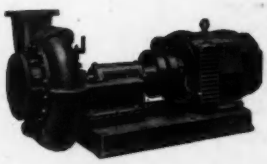


Stoneware pump for Corrosive and chemicals



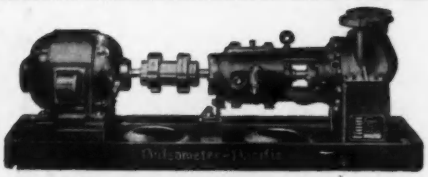
"HS" Type—for water services. All heads up to 500 feet.

The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.

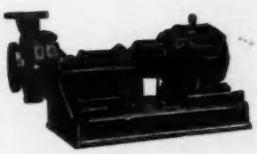


Slurry pump for coal washing and abrasive liquids.

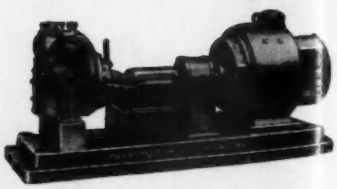
Reciprocating pump of modern design for Gas Works.



Pulsometer—Pacific type, based on latest American practice.



"JA" & "JB" types for high temperature water circulation.



Self priming centrifugal pumps.

LONDON OFFICE:- 39, VICTORIA STREET, WESTMINSTER, S.W.1.
BRANCHES:- BIRMINGHAM · CARDIFF · GLASGOW · LEEDS · MANCHESTER · NEWCASTLE - ON - TYNE